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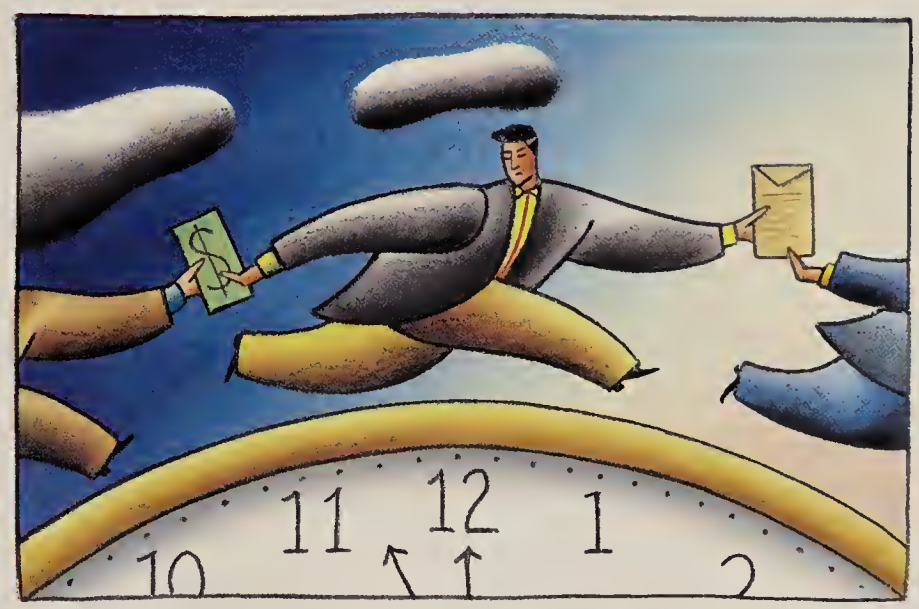

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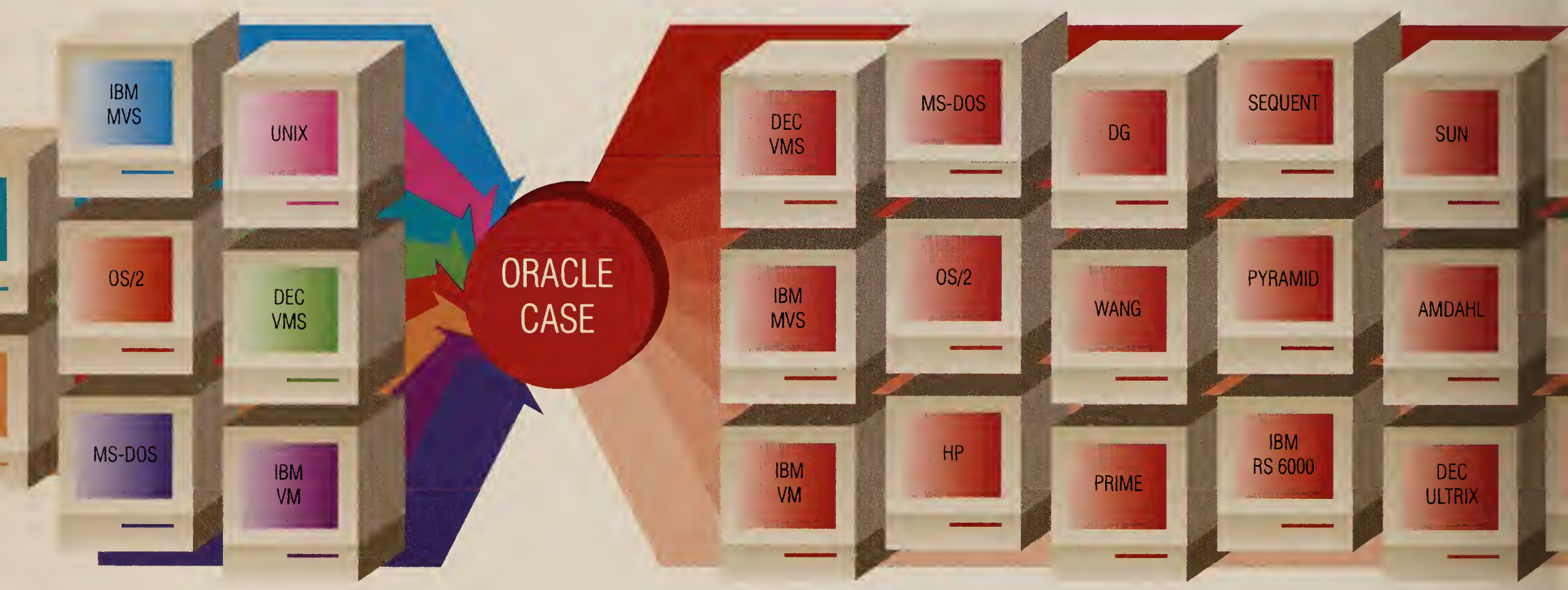

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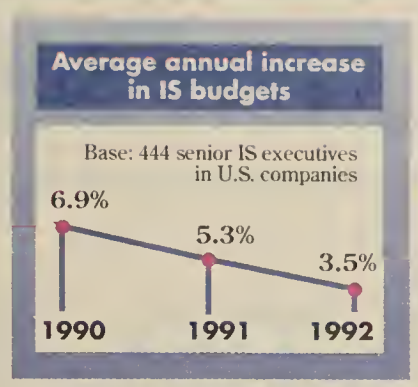

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▶ **IS seeks dollar-stretchers.** Tactics include end-user training, re-engineering, downsizing and a back-to-basics approach. See Buck Bangers, pages 16-17.

▶ **Re-engineering top concern.** More than 90% of IS shops say they are currently working on projects. Advocates say business process redesign is workable for both high-fliers and struggling companies. Page 8.

▶ **Budget growth slowing.** Average increase dipped to 3.5%, down from 7.5% in 1990. Staff spending slipped, equipment spending rose. Biggest cuts are in airlines and computers/electronics, while media/entertainment and transportation get the biggest increases. For other budget information, see page 6.

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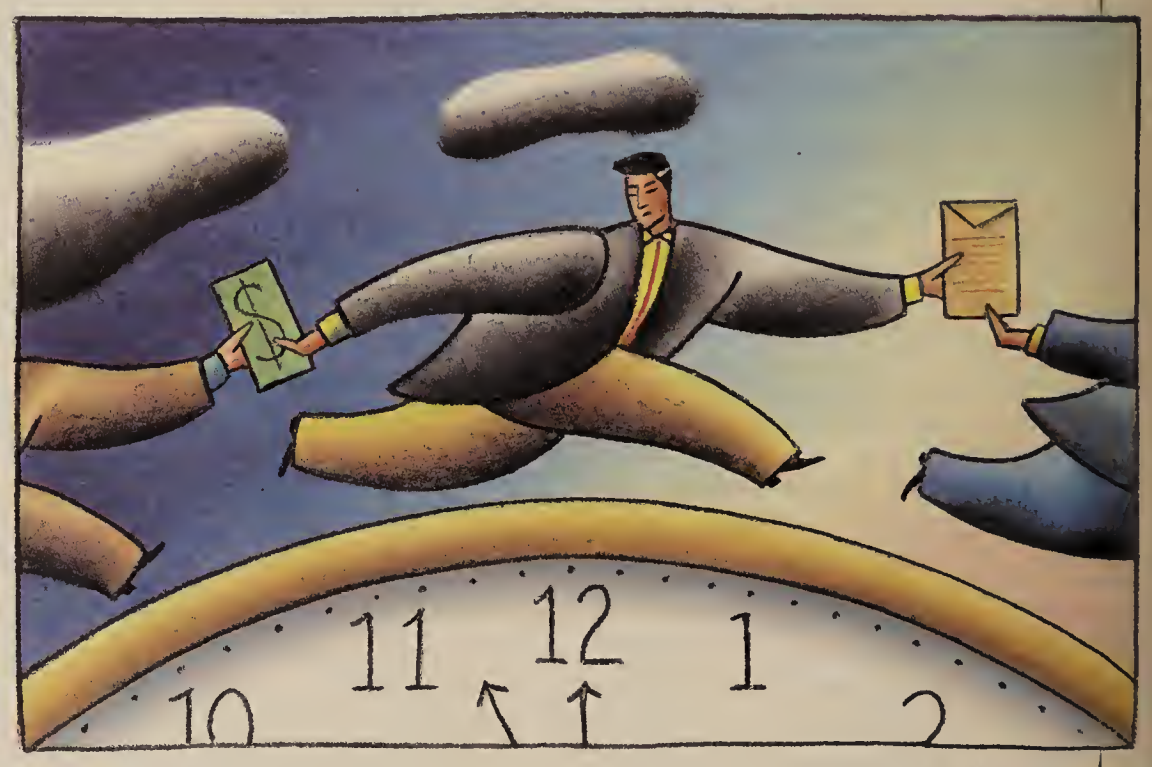
Faster! Better! Cheaper! Now!

Tough times put new pressures to do more with less on harried IS shops

BY CLINTON WILDER and CAROL HILDEBRAND



Kurt Vargo

Watch out — you might get what you're after.

— Talking Heads

For years, information systems departments battled for recognition as key partners in business success. Today, all but the most backward organizations view information technology as critical to success in the 1990s.

Alas, that recognition has also brought unprecedented pressure (and often pain) to IS professionals. Constant demands to "do more for the business" have arrived smack in the middle of a stubborn recession that has frozen or even gutted technology budgets.

To make matters worse, the outsourcing phenomenon — fueled by corporate giants such as General Dynamics Corp. and Continental Bank Corp. — has captured the fancy of company presidents and chief financial officers everywhere. As a result, even well-managed IS shops are under the gun to prove they can do the job better than outside contractors.

"The instability in the IS profession right now is just terrible," says Rich Koeller, chief information officer at Whirlpool Corp. in Benton Harbor, Mich. Aside from outsourcing pressures and high CIO turnover, Koeller bemoans the lofty and often vague technology expectations of business executives. The whole state of affairs, he says, "causes some people to wonder if they want to be in this line of work — just at the time when we need the best and the brightest."

But IS chiefs are buckling down to find new and creative ways to cope.

For Koeller, that has meant freezing IS spending at 1991 levels and asserting more control over new and ongoing IS projects. All IS projects must now be detailed on a two-sided form, explaining costs and business benefits on the front and technology budget details on the back. Projects are planned by joint IS/business teams, but it is the business team that sets funding priorities.

"We have to align [technology] expenditures with the business goals. It's that simple," Koeller explains. "Only the business can do that."

Koeller has plenty of company. In a CSC Index, Inc. survey of 444

Continued on page 4

Keeping customers happy is top job for IS

BY DEREK SLATER

For retailer Nordstrom, Inc., "customer service" means having shelves and racks filled with exactly the fashions postholiday shoppers are looking for. For trucking firm Consolidated Freightways, Inc., it means quicker response to customer inquiries.

While the term means different things to different businesses, nearly everyone agrees on one thing: Happy customers are the key to survival. As the recession lingers, many companies in every industry are realizing they can't afford to risk losing precious customers with poor service. And as the talk grows louder, much of the conversation centers around information systems and technology.

"IS is the best game in town in terms of servicing customers in a new way," says John Cunningham, president of Competitive Technologies, Inc., an Easton, Conn.-based consulting firm. One reason, he says, is that technology lets companies learn more about customer preferences and priorities. Thus, companies can give customers what they want — and more quickly.

One-fifth of top IS chiefs in *Computerworld Premier 100* companies named customer service as the single biggest challenge facing their industry in 1992. Similarly, nearly 500 top IS executives in a recent survey by CSC Index, Inc. listed order processing, postsales customer service and product delivery as the top areas of technology investment in '92 (see chart page 6). CSC Index analysts say the results clearly reflect growing concern for satisfying customers.

Companies needn't make huge investments – or any at all – to improve customer service with technology.

Savvier companies are already using technology and taking their lead from the customers themselves.

For instance, Nordstrom recently turned to its IS department to find a way to help its 68 stores quickly and flexibly change inventory on demand. The solution: a project now under way that replaces telephone communications with the store's 20,000-plus suppliers with electronic data interchange and electronic mail. The bottom line, says Pat Adkisson, implementation supervisor, is that "the system lets us

Continued on page 7

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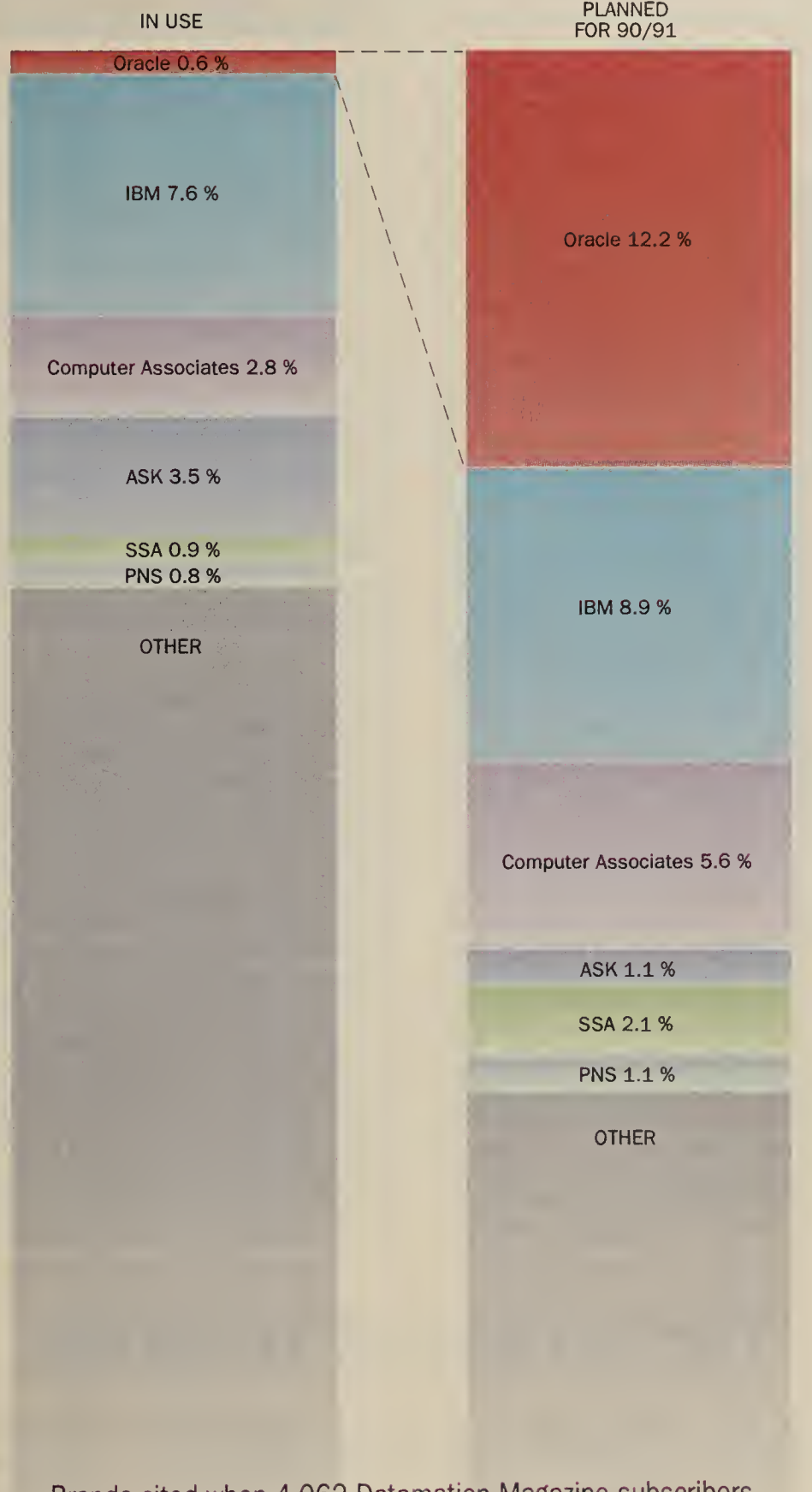

Brands cited when 4,062 Datamation Magazine subscribers were asked "Do you have in use now, or do you plan to use initially in 1990/91, Financial/Accounting software with your minicomputer/workstation system?*

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CONTINUED FROM PAGE 2

North American IS executives, the No. 1 issue for 1992 is "aligning IS and corporate goals." "Re-engineering business processes" fell to second place after two years on top (see story page 8).

Ironically, aligning IS and business was also the No. 1 issue back in 1988, when technology was seen as the key to gaining competitive advantage. But better teamwork is no longer just "nice to have"; it's a matter of *survival* — for both IS chiefs and their companies.

One result is that a system's success is increasingly judged by whether business efforts — such as retraining, redesigning business processes and changing customer expectations — also come to fruition.

"Lots of CIOs are realizing that they can't create a silver bullet for their business," says Robert Dantowitz, a CSC Index principal.

As management realizes that pouring money into information technology will not meet strategic needs, IS is finding that the funding well is not bottomless.

Jack Van Antwerp

Whirlpool's Koeller: *'The instability in the IS profession right now is just terrible'*

As a result, "do more with less" continues to be the Holy Grail. Faced with both cost-cutting and greater benefit scrutiny, many organizations are employing a variety of strategies (see box below).

"This is . . . an investment recession, and [information] has been one of the biggest investments," says Robert Snoyer, chief quality officer at Profit-Oriented Systems Planning Program, a Carrollton, Texas-based IS research consortium. "Like real estate, we have overbuilt and overinvested. It's time to slow down and sort it out."

Budget growth slows

IS spending is indeed slowing. In the CSC Index survey, projected hikes in technology spending for 1992 dropped for the third straight year. Average increase: 3.5%. Not surprisingly, aerospace and defense was hardest hit, suffering a projected 7.1% plunge in 1992.

"My three biggest issues are cost management, cost management and cost management," says Jim Sutter, vice president and general manager of IS at aerospace giant Rockwell International Corp. in Seal Beach, Calif. "We make all these cost cuts, and yet at the end of the day, users still feel we're not moving fast enough."

So far, expense containment tactics have included personnel reductions, data center consolidations and encouraging more bidding wars among vendors seeking Rockwell business. The company is even beginning to question the number of redundancies and backup systems in place. "We are starting to review those to see if users can still afford to pay for them," Sutter says.

In every industry, companies are searching out sacred technology cows and taking a fresh, hard look at their practicality. Nothing is beyond close scrutiny — even maintenance of older applications.

"Some little enhancements that we spend a lot of resources on don't give us very much of a payback," says Bob Ferkenhoff, vice president of information services at Sears Merchandise Group in Chicago. "We've been trying to look at those things a lot more sharply and shut down parts of systems that no longer have real business application.

"Software packages, offshore development — we're more open to all the alternatives," he says.

David Joel

Sears' Ferkenhoff: *'Some little enhancements that we spend a lot of resources on don't give us very much of a payback . . . We're more open to all the alternatives'*

Work has stopped on a new payroll system at Pacific Bell, where IS spending will plunge 10% in 1992.

"The old one is perfectly good — everyone gets paid," says Jack Hancock, executive vice president of the product and technology support group at the San Ramon, Calif.-based Bell operating company. "A lot of things have grown up over time that you don't need."

Another Pacific Bell cost-cutting strategy: Push more IS decisions out to business units. "If it's in their budget, they have to portfolio-manage it," Hancock explains. "We hold the business unit head responsible for bad IS decisions — like any other business decisions."

Moving to new platforms

Besides scrutinizing applications, companies are moving to new platforms in their attempts to save money and boost responsiveness. Downsizing and migrating to client/server architectures are hot in the dawn of 1992, jumping from ninth to second place among new technologies in the CSC Index survey and topping a similar member survey by the Society for Information Management.

Most IS executives want to test those new waters carefully before plunging in, however. "You can blithely say that client/server is less expensive, but there isn't enough experience yet to know that," notes Jim Marston, CIO at American President Cos. in Oakland, Calif. The company has formed a "platform placement committee" to review new and existing applications and match them to the architecture that makes the most sense.

With most analysts predicting another tough year economically, IS shops aren't going to stop seeking new ways to trim costs, improve service and deliver bigger business benefit.

The mandate could not be more clear: 67% of CSC Index survey respondents report feeling pressure from senior and line executives to quantify the value of IS spending. Only 14% said they feel no pressure.

However, quantifying is easier said than done. "We all know that what systems can provide is critical and necessary," says Al Hyland, director of the Systems Management Division at Polaroid Corp. "Yet it remains difficult to draw clear return-on-investment benefits to the systems infrastructure."

Will IS be up to the task? In many cases, the answer may be no. Executives whose technology strategies are not in sync with the business will find themselves in serious trouble. More CIO heads are likely to roll, and mega-outsourcing deals will become more commonplace as the year progresses.

If there is any bright spot to be seen, it's that IS seems to understand the magnitude of the challenges it faces in the new year.

"We know from the get-go that costs have to go down, and quality has to go up," says Bob Leto, manager of information services for the Orange County, Calif., operations of struggling Unisys Corp. "That's a given. That's our job."

The tactics they're taking

Hard-pressed IS chiefs are employing numerous tactics to maximize their IS operations — and to safeguard their jobs.

Outsourcing. It is becoming increasingly popular to hire an outside contractor to take over commodity IS operations, such as data center operations and software maintenance. A hefty 64% of 1991 *Computerworld Premier 100* companies said they have evaluated the possibility of outsourcing some or all of their IS operations.

By 1995, 60% of all large U.S.-based firms will outsource some part of their IS operations, according to Meta Group, Inc., a market research firm in Westport, Conn., with 10% outsourcing the entire function.

Downsizing. Many firms plan or have started to move applications to smaller platforms and, in some cases, get rid of mainframes altogether. One piece of evidence: Client/server technology was the second most frequently cited emerging technology of the greatest interest (behind imaging) in the CSC Index annual survey of IS executives, up from ninth place a year ago.

Re-engineering. Another favorite. Working with business units to rethink or "re-engineer" processes was cited by no less than 81% of *Premier 100* companies. Winners said it was "very likely" they will redo businesses processes over the next 12 months. Only 6% said it was unlikely (see story page 8).

New metrics. As pressures mount to justify technology, companies are seeking new ways of demonstrating the business value of IS.

More people focus. In the CSC Index poll, "improving the human resource" jumped from 13th place in 1990 to the fifth most important concern of IS executives.

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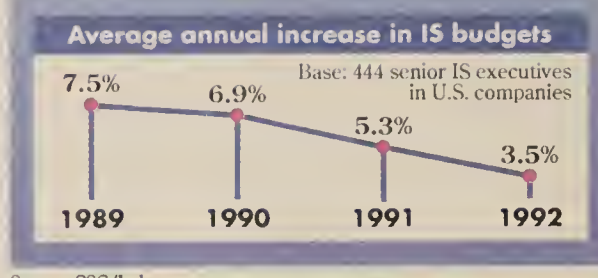
Spending slowdown continues

IS budgets will hit a three-year low in 1992, rising at less than half the rate of three years earlier



Source: CSC/Index

Where leaders spend

Computerworld Premier 100 *companies expecting budget increases will spend on:*

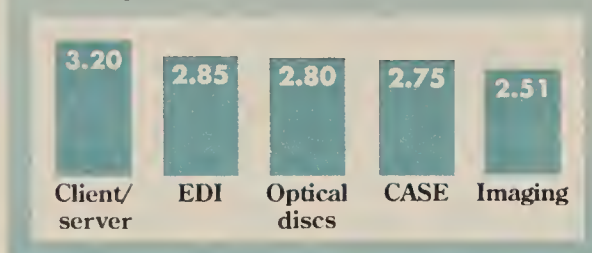
Hardware	37%
Software	30%
IS staff	23%
IS training	22%
Capital investments	21%
Application systems development	6%
Other	4%
Don't know	1%

Base: 58 companies; multiple responses allowed

Source: *Computerworld Premier 100*

Tech watch

Based on a scale of 1 to 4, with 4 being extremely important, IS chiefs rated the following technology areas worth watching



Base: 580 high-level executives

Source: Society for Information Management

Media flies high, airlines plunge

Of 16 vertical markets, only four budgets will increase in the coming year

	IS budget change from previous year		IS budget as percent of revenue		Top technology investment area
	1992	1991	1992	1991	
Aerospace	-7.1%	-3.0%	4.4%	4.1%	Engineering
Airlines	-5.0%	+8.1%	2.2%	3.1%	Services delivery and asset management
Automotive-related	+1.4%	+6.5%	1.0%	1.2%	Manufacturing/operations
Banks/financial services	+5.3%	+2.2%	0.8%*	0.7%	Service delivery/logistics
Chemicals	+0.8%	+3.2%	1.8%	1.8%	Order processing/handling
Computers/electronics	+1.1%	+10.5%	3.2%	3.4%	Training/education
Consumer, food products	+6.4%	+8.8%	1.5%	1.6%	Order processing/handling
Insurance	+5.6%	+6.2%	4.2%	3.8%	Postsale customer service
Media and entertainment	+7.5%	-0.9%	2.8%	3.1%	Order processing/handling
Mining and metals	-0.3%	+6.6%	1.4%	1.1%	Inventory
Oil and energy	-2.2%	+5.9%	1.0%	1.1%	Manufacturing/operations
Pharmaceuticals	+8.6%	+8.5%	2.6%	2.0%	Research and development
Retailing/restaurants/ wholesale	+2.9%	+6.1%	1.1%	1.1%	Inventory
Telecommunications	+2.4%	+8.4%	8.6%	4.1%	Order processing/handling and accounting/billing/finance
Transportation	+7.3%	+1.3%	2.1%	2.6%	Services delivery/logistics and postsale customer service
Utilities	+1.1%	+5.4%	1.7%	1.6%	Postsale customer service

*IS budget as a percent of assets

Base: 444 senior IS executives in U.S. companies

Winners Media and entertainment, up 8.4% from '91. Transportation, up 6%. Banks/financial services, up 3.1%. Pharmaceuticals, up 0.1%.

Losers Airlines, down 13.1% from '91. Computers/electronics, down 9.4%. Oil and energy, down 8.1%.

Source: CSC/Index

Hot priorities

Where IS says it will invest

	Percent of respondents	
	1992	1991
Order processing/handling	48%	54%
IS development	48%	52%
Postsale customer service	46%	48%
Product delivery/logistics	43%	48%
Manufacturing/operations	42%	45%
Presale customer service	35%	43%

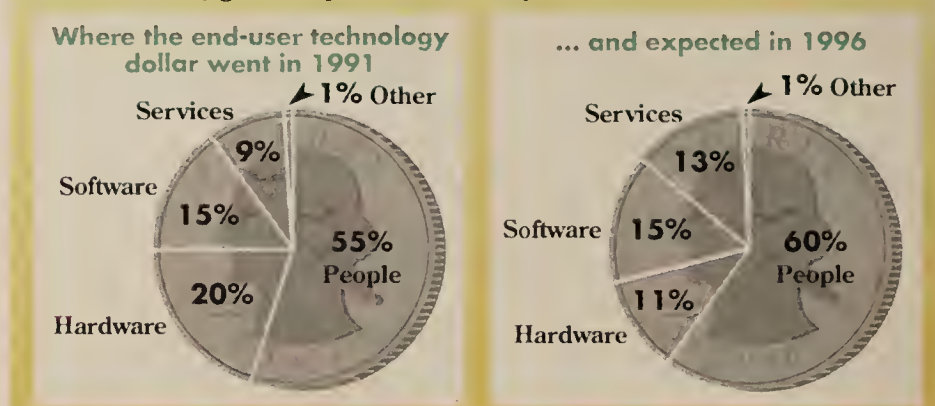
Base: 444 senior IS executives in U.S. companies

Undisputed heavyweight: Four of six investment areas reflect growing interest in customer service, increasingly a differentiator for companies in a lagging economy.
Surprise contender: While it didn't make it into the top half-dozen, accounting/billing/finance technology made the biggest leap in interest.
TKO: The number of IS execs interested in sales technology will drop 29% this year. Companies will instead re-engineer processes.

Source: CSC/Index

The bite of hidden spending

For every dollar spent on information technology, another 13 cents is spent on technology-related products and services by end-user departments acting on their own. The figure is expected to double by 1996.



Base: 250 Fortune 1,000 firms

Source: Gartner Group, Inc.

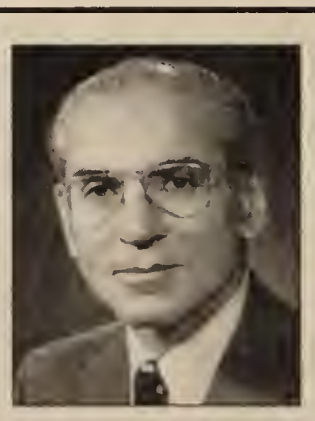
CW Charts: Marie Haines

CEO POLL

Boss' pet tech

If you could choose one thing to spend money on for information technology in 1992, what would it be?

Dale Johnson
CEO
SPX Corp.:
"I would spend it on training for our people because they are the key to our company's future."



Josh Weston
CEO
Automatic Data Processing, Inc.:
"We already spend a substantial amount on information technology R&D. If we had both the extra talent and the extra money, we would especially speed up the decentralization of more client services from our mainframes to client site micros in a DOS/Windows environment."

William L. Weiss
Chairman and CEO
Ameritech:
"Ameritech is especially interested in using information technology to add more intelligence to the public switched network. We believe that meeting our customers' needs in the future requires us to make such an investment now. Ameritech is committed to giving customers the capabilities they need, when they need them, to make telecommunications a more valuable part of their households and businesses."

Europe adopts tough rules for user health

BY RON CONDON

What if one of your users told you, "This software is too hard to use and is stressing me out. I'm reporting you to the authorities?" Don't laugh, for your sake.

If your company has operations in Europe, you'll soon have to take complaints like that very seriously. If you're wise, you'll avoid the whole problem by making doubly sure that the software, hardware and the entire working environment — furniture, lighting and even working patterns — conform to new European Community (EC) rules to be implemented by the end of 1992.

The tricky part is that the new EC rules will extend far beyond well-accepted measures such as removable keyboards, low-radiation screens and adjustable monitors into new areas, including software design and job composition.

Among other things, new regulations make employers responsible for remedying health risks and providing free eye tests. Also, companies are legally obliged to provide training and to keep abreast of the latest advances in workstation design.

Because of the tight deadlines, companies must act quickly. Computer users and computer suppliers to the EC have just a year to get their acts together. But there's another catch: Because the rules exist only as a general EC directive, the 12 member nations must each formulate their own laws, and they'll probably do that with varying degrees of strictness.

That creates a great deal of uncertainty in the user community, as firms anxiously wait for governments to pass laws before getting concrete guidance.

Countries with high ergonomic and health standards, such as those in Scandinavia, will be in good shape to make the January 1993 deadline. Others will not.

In the meantime, firms are making educated guesses about the new rules, doing their best to extract concrete ideas from the dry language of the directive.

The major concern is that every piece of equipment purchased must conform to the directive, although the rules provide for a four-year grace period. The next move for many companies will be to conduct an audit of all installed hardware and software and working conditions and to assess what is needed for compliance.

All this could be quite a challenge for employers. But Colin Mackay, a member of the UK's Health and Safety Executive, which is responsible for framing the UK's laws, says, "These laws are going to have around 3 million inspectors to enforce them — the users themselves."

Condon is London correspondent for the IDG News Service.

Satisfied customers are top job for IS

CONTINUED FROM PAGE 2

have the merchandise that customers want in the store."

"Fast response" is a big part of customer service for most companies, whether that means quickly spotting consumer trends or providing on-the-spot remedies for customer complaints.

Until recently, Consolidated Freightways would take up to 20 days to answer a customer complaint — a long time to be searching for sales documents when a client is screaming about a shipment of dented refrigerators, says Marty Lulay, general manager of the Portland, Ore.-based company's Image Services business unit.

So with $10 million worth of imaging technology, Consolidated Freightways now has almost instant access to three years' worth of shipping and billing documents, equal to about 56 million pieces of paper. Now, the company can send all the pertinent documents to a displeased client within five to 10 minutes of receiving the request.

With the economy still sputtering, some companies may wince at a $10 million investment. But Consolidated Freightways says it's important to keep an eye not only on long-term savings but also on less quantitative benefits.

In fact, companies needn't make huge investments — or any at all — to improve customer service with technology. When Hertz Corp. wanted to make renting a car easier for customers, says Gary Orrell, staff vice president of MIS at Hertz, "We looked at our existing technology and said, 'How can we use this better?' "

Hertz reasoned that customers really care about things like the amount of time they have to spend leaning on the counter and filling out forms, Orrell says.

So the company set out to find ways of using installed systems to offer clients added convenience. One approach was to create the "#1 Club Gold" program. For $50 a year, members can have car rental preferences — such as model — stored in a Hertz database. When it comes time to rent, customers go straight to the parking lot, where all the necessary paperwork is waiting in the desired car.

Many IS chiefs are betting that the emphasis on using technology for customer service will intensify as the decade progresses. "Customer service has to evolve as people evolve," Adkisson says.

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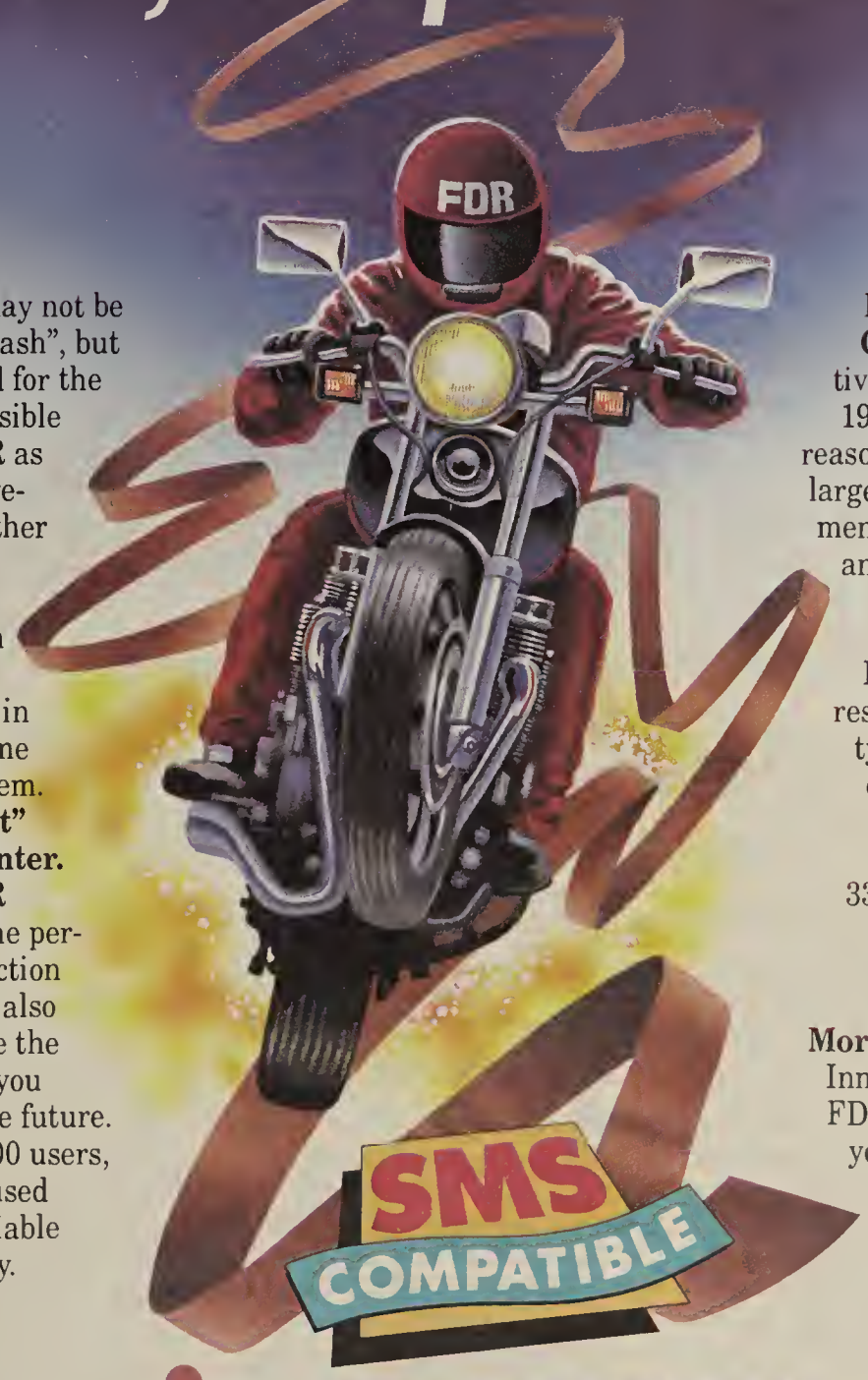

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Never fear — 're-engineering' is here!

BY CAROL HILDEBRAND
and CLINTON WILDER

A depressed economy, leaner budgets and tougher competition are forcing IS managers to re-evaluate their operations

Redesign, recycle, restructure, redevelop. With information systems managers increasingly under the gun, more attention is being paid to "re" words, especially the hottest one of all: re-engineering.

"We're all sitting here with fat organizations and processes that are tired and old," says Charles Darnell, chief information officer at Lithonia Lighting in Conyers, Ga. "We all have to re-engineer [and] reorganize our organizations in order to compete."

If polls are to be trusted, nearly everyone in 1992 will be rethinking and rebuilding business processes around technology, or at least thinking seriously about it (see box page 4).

Good for all

A big part of re-engineering's appeal is that the concept is equally workable for highfliers and companies struggling to stay aloft, says Greg Tucker, a principal at the San Francisco office of CSC/Index, Inc. and the leading evangelist of re-engineering, along with consultant Michael Hammer.

"Both groups are incredibly motivated," Tucker says, "one by opportunity and one by fear. And fear can be a powerful motivator."

Those looking for immediate, measurable savings from the process may be in for trouble, however. Many re-engineering efforts are on three- to four-year schedules, and most experienced people agree that short-term benefits are generally slim to none.

"You don't undertake re-engineering because of [return on investment]. You do it because the threshold of pain of the way you have been doing things is too high," says Ray Manganelli, chief executive officer at Gateway Information Services, a New York-based consultancy specializing in outsourcing and re-engineering.

Sergio Baradat

Success not a given

But even biting the bullet and launching into a long-term, probably messy project doesn't guarantee success. A well-oiled internal machine can quickly seize up once it hits the outside world. Thornton May, co-founder of Praxxis Consulting Group in Burlington, Mass., advises companies to pay more heed to linking cogs *outside* corporate walls, such as customers and suppliers, when re-engineering internal processes.

Otherwise, "it's like rearranging deck chairs on the Titanic," he says. "It can really make things worse."

Another stumbling block, experts say, is proceeding without buy-ins from nontechnical groups affected by the project. "Re-engineering is not an IS function," Darnell says. "If they don't involve the value chain, they're not only rearranging deck chairs, they're hiding the damned lifeboat."

But it's not always easy to get the crucial people on board. "Initiating change is the hardest thing in business," says James G. Connelly, group vice president of hospital sales and distribution at Baxter International, Inc. "Even if it's good, people don't want to do it."

Despite such big potential obstacles, Manganelli predicts that the triple pressures of recession, leaner IS budgets and tougher competition that first stimulated interest in re-engineering will also transform it.

The biggest difference, he predicts, will be shorter projects lasting one or two years.

IS heads changing hats

BY CLINTON WILDER

You might call it job insecurity. Not so long ago, the top information systems job in most companies was also among the most stable of management positions. If you kept the systems running, stayed within your budget and kept the applications backlog reasonably in check, you were pretty much assured of continuous employment until gold watch time.

No longer. The new demands on IS as a critical partner in business strategy, combined with a strong wave of cost-consciousness, have taken their toll on some of the biggest names in IS management.

Some firms have placed a business executive in charge of the IS function to better integrate technology into the business. In Du Pont Co.'s case, the aim is to coordinate the firm's billion-dollar cost-cutting initiative in IS.

However, chief information officer turnover is not all negative or involuntary. The same new demands have dramatically raised both the status and salaries for the brightest minds in IS. A new breed of "IS superstar" is being lured to new employers like baseball's free agents — with very lucrative compensation packages.

The past 12 months also saw the retirement of some of the most highly regarded executives in the business, including Dale Fieldcamp at Caterpillar, Inc. and Ken Bender at Southwestern Bell Corp. The chart to the right is a list of key chief information officer departures during 1991.

IS chief	Left	Joined
John Hammit	United Technologies	None
Laurance Burden	S.C. Johnson	Fannie Mae
Allan Ditchfield	MCI	Progressive Co.
Ron Ponder	Federal Express	U.S. Sprint
Mike Heschel	Security Pacific	Kroger
Jack Cooper	CSX	Jos. E. Seagram
George DiNardo	Mellon Bank	Carnegie Mellon Univ.
Barry Kotar	Covia	Northwest Airlines
Larry Ford	IBM	System Software Associates
Alan Jones	Unisys	Tektronix
Robert Wagner	Pan Am	Conrail
Francis Dramis	Salomon Brothers	Network Management, Inc.
Ray Cairns	Du Pont	Retired
Jon d'Alessio	McKesson	McKesson (new position)
Ken Bender	Southwestern Bell	Retired
R. Anne Payne	EMI Music	Consulting
Albert Cinorre	Merck	Retired
Dale Fieldcamp	Caterpillar	Retired
Charles Hamlett	La Quinta Motor Inns	None

CW Chart: Janell Genovese

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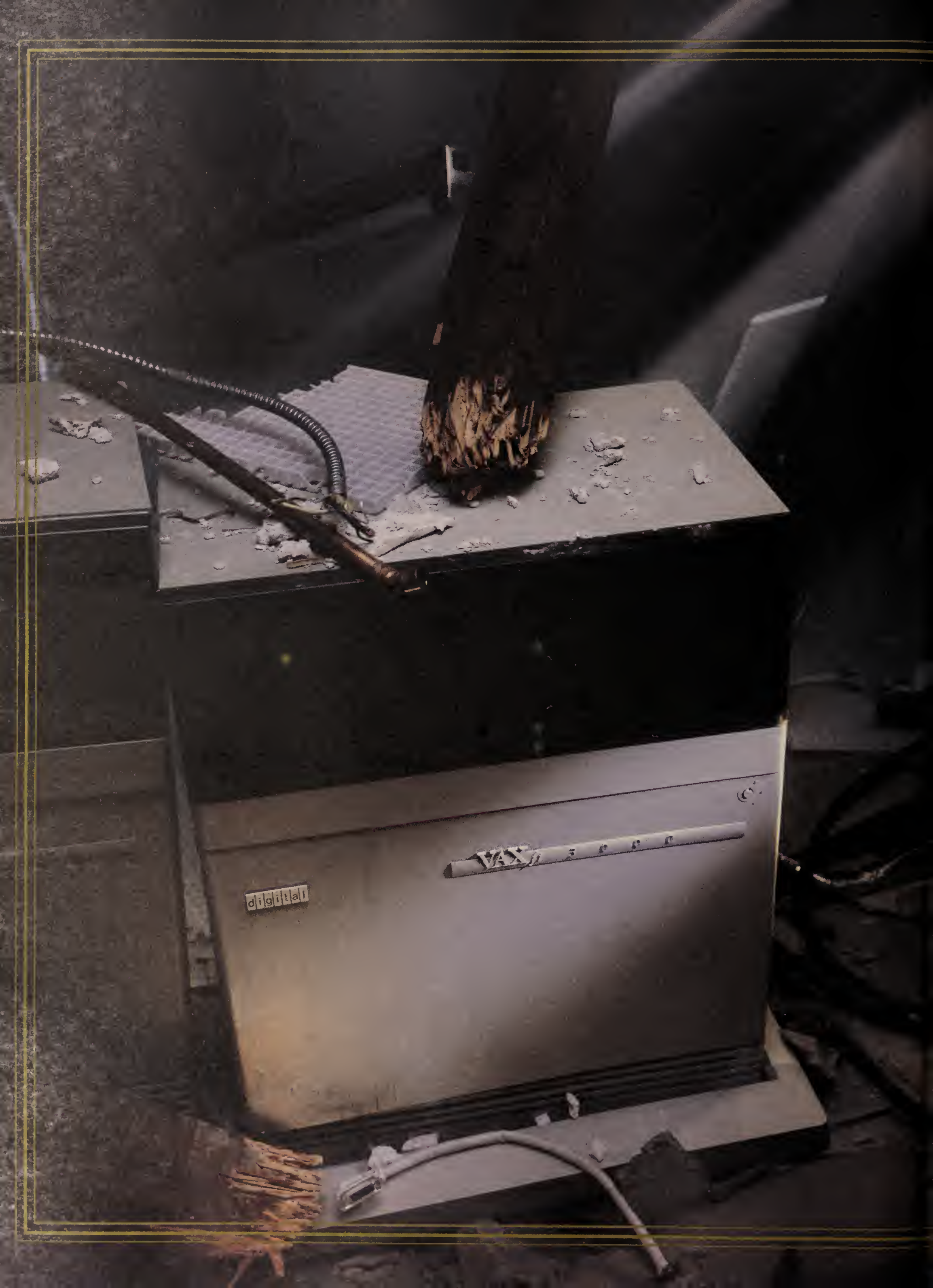
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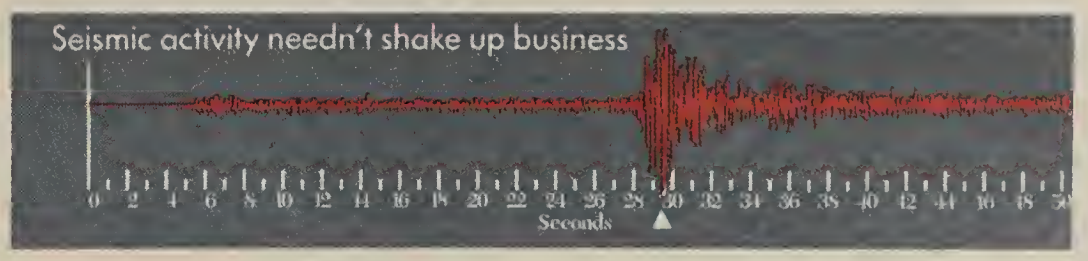

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Jobs 1992

The cold reality: The employment forecast for 1992 doesn't look much better than '91. While the federal government predicts the number of computer-related positions will grow 50% to 80% by 2005, that's hardly consolation for job hunters or job changers today. This map will help guide your trek across the current rough terrain.

Compiled by Cathleen Duffy and Lory Zottola. Design by Janell Genovese.

National outlook

Industry forecast

- Biotech
- Health care
- Pharmaceuticals

- Financial services
- Consumer products
- Manufacturing
- Insurance
- Utilities
- Education
- Federal government

- Banking
- Retail
- Aerospace
- State government

See map for regional, city forecasts

Seattle •

Spokane •

Portland •

Northwest
Aerospace

California
Banking
Aerospace
High-tech

• San Francisco

California
Biotech

Los Angeles •

San Diego •

• Phoenix

Tucson •

Network manager/ administrator
$53,250

Midwest
Financial services
Consumer products
Manu-facturing
Education
Banking

• Denver

Southwest
Banking
Retail

Northern California
Microcomputer manager
$53,833
Database manager/administrator
$61,333

Fort Worth • • Dallas

Houston •

Wise words for hard times

What IS pros can do to gain a job-hunting edge in a tough year

Rick Bawsel

Southeast region staffing manager
General Electric Consulting Services
Atlanta

Be flexible in the types of projects you'll work on. Don't limit yourself by saying you'll only do new development or only want to manage.

Ralph E. Jones

Data processing manager
Association of the U.S. Army
Arlington, Va.

If you list only programming skills on your resume, that tells me you sit at the keyboard. If I know you've helped put together a newsletter or arranged a speaker or given a presentation, these are skills that make a person promotable.

Harvey Daniels

Employment administrator
Federal Reserve Bank of Chicago

Be self-confident without being arrogant. There is no greater winning trait.

Nancy Thompson

Staffing specialist coordinator
Cap Gemini America
Atlanta

A job applicant we ended up hiring prepared a presentation with overheads on why we should hire him, what his goals were, where he wanted to be and how he was going to get there. Be creative.

Charts based on *Computerworld* survey of 28 U.S. placement specialists, IS managers and academics

LAN manager/administrator
$52,250

CIO/VP/Director of IS
$94,400

IS manager/supervisor
$67,280

Programmer/analyst
$38,988

Hot tech

Experts say specializing in these technologies can boost your marketability

1. Networking/LANs
2. Unix
3. CASE
4. Windows development*
5. AS/400, systems integration*

*4 and 5 tie

• St. Paul
Minneapolis

Midwest
Steel
Autos

Chicago •

Detroit •

New York
Financial services
Retail

• Boston

Boston
Biotech

• New York

Northeast
Insurance
Pharma-ceuticals

Northeast
Banking
Real estate

East coast
Health care

Delaware •

Washington, D.C.

Washington, D.C.
Federal government

Mid-Atlantic
Pharma-ceuticals

• Atlanta

• Orlando

• Tampa

• Miami

Best jobs

Tried-and-true titles will shine next year, as companies emphasize the basics to get through the economic slump

"What will be the hottest job titles in '92?"
Percent of respondents

CIO	35%
Programmer/analyst	35%
Database administrator	27%
Network technician	23%
Network manager	19%
Consultant	19%
Project leader	15%
Data architect	13%
LAN administrator	12%
Unix administrator	12%

Up & comers

- Knowledge engineer
- Manager, advanced technology
- LAN/WAN specialist
- Client/server designer
- Internal systems integrator
- GUI developer
- CASE specialist
- Strategic planner/IS

Key

Bright spot
Mixed forecast
Stormy

Hot area for jobs
Warm area for jobs
Cold area for jobs

Layoff alert

Northeast: Severe, due to bank mergers, failures and sluggish real estate market.

Midwest: Moderate, as automakers and steel and manufacturing firms continue layoffs.

California: Milder, but recession will trim banking, aerospace and high-tech payrolls.

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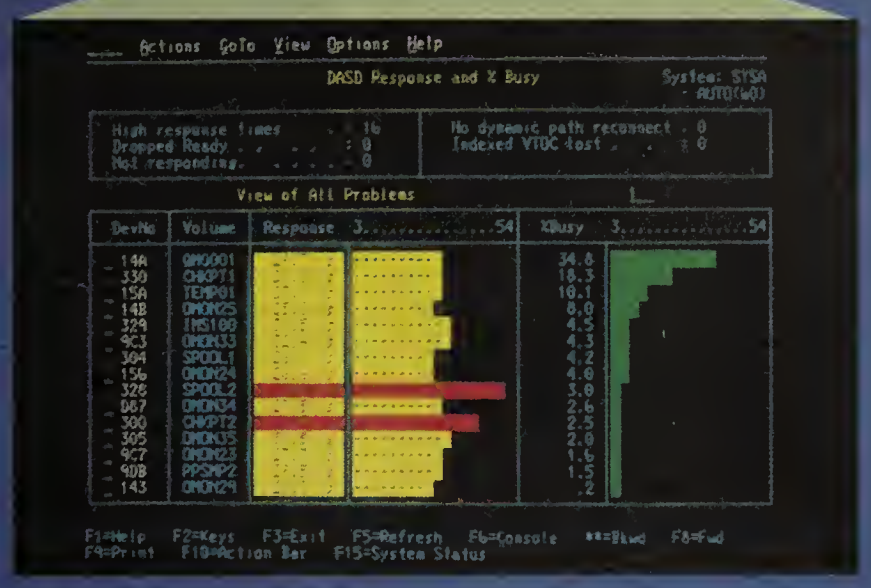

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BUCK BANGERS

Meet five IS departments that squeeze every cent from technology dollars

END-USER TRAINING

Users help Alaska Air soar

It's a typical day at Alaska Air Group, Inc., and hundreds of employees in accounting, maintenance, flight operations and other departments log on to the corporate IBM mainframe. Once on-line, they access and analyze information that at many other organizations would be considered sacrosanct to all but the highest level executives.

Even more striking is that many white-collar workers at the $1.1 billion Seattle-based holding company of Alaska Airlines routinely work with the information systems department to develop or customize departmental software. At a company that sees highly skilled users as the best way to boost productivity and contain technology costs, it's all part of the job.

"The idea is for workers to do end-user computing as a means to leverage themselves," explains Leif Haslund, assistant vice president of administrative services at the airline. The strategy works to hold down IS costs — even as the airline continues to expand — because workers who do their own computing require fewer IS professionals to support them, he says.

According to Haslund's own "unscientific study," Alaska Airlines used to employ one IS professional for every $18 million in revenue it generated. Now, with end users doing much of the computing themselves, there is one IS staff member for every $25 million in sales.

King is a free-lance technology writer based in Ridley Park, Pa.

What's more, in the seven years that end-user computing has been deployed, IS spending has held steady at less than 1% of company revenue. Meanwhile, the most widely used barometer of airline passenger business — passenger revenue miles — has climbed by more than 50%, Haslund says.

IS out of daily grind

The notion of cashing in on end-user computing began evolving soon after personal computers, spreadsheets, early desktop publishing software and fourth-generation languages arrived at Alaska Airlines in 1985. The new technology, combined with a desire to "take the IS department out of the operations loop whenever possible," made end-user computing a natural choice for the company, Haslund says.

Since then, Alaska Airlines has installed approximately 550 Apple Computer, Inc. Macintoshes and 150 IBM PCs and compatibles. These desktop devices are networked to each other, as well as to the corporate IBM mainframe and the System One reservation system used by the airline. The result is that any and all information can be transferred to and from all of the airline's computing platforms.

Most data can be directly accessed by all employees, 300 of whom have been trained to use Information Builders, Inc.'s Focus, the language adopted for end-user computing.

For example, the airline's in-house frequent-flier application regularly samples data from the reservation system, from forecast travel patterns to scheduling requirements. Similarly, in-house staff members use data accessed from the System One reservation system to determine the correct number of airline meals needed on a particular flight.

Rich Frishman

Haslund: *Smarter end users keep IS costs down*

All employees — many of whom were already highly PC-literate, according to Haslund — are also trained in the basics of computer operations and applications. They are taught in a customized program developed by an outside consulting firm and based on Alaska Air Group's IS standards.

"We basically allow end users to get at a substantial number of corporate files in whatever way they want," Haslund says.

A key goal is to free the 84-member IS department from routine data processing in order to focus on applications development and other strategic projects. Today, IS sees itself primarily as a support group, Haslund says.'

Indeed, one of the chief benefits is decreased reliance on IS for routine analyses and reports, which workers throughout the company now prepare themselves.

More self-sufficient users let IS focus on systems integration and optimization, the company's other key IS cost-containment strategies. The idea is to customize existing systems, software and applications programs instead of building new ones.

The approach seems to work very well. Since 1984, Alaska Air Group has kept IS costs under $10 million, thanks largely to its end-user focus, Haslund says. In 1992, he expects IS spending to total about $7.5 million, up about 10% from the previous year.

Haslund says he doesn't foresee IS costs dropping during the next year. But he does anticipate further IS productivity gains, especially new applications.

"IS isn't growing as fast as the airline, yet we're still putting in more applications. The moves we've made so far have brought phenomenal productivity. We'll stay on this course."

JULIA KING

BACK TO BASICS

Pacific Stock Exchange keeps eye on business

Forget technological genius, says John Parady at the Pacific Stock Exchange. The key to creating efficient, economical systems is a near religious adherence to classic systems development methodology — and an unshakable focus on the bottom line.

Parady, executive vice president of technology services at the San Francisco-based exchange, has the numbers to prove his approach: New information systems projects at the Pacific Stock Exchange typically yield a rate of return of 15% or higher.

To get such impressive gains, Parady follows a simple principle: "If it doesn't make sense for business, don't do it."

A good example of this principle is the exchange's $5 million options exchange trading system, known as Poets. The system provides automated order routing and execution, book maintenance and other services to traders in Los Angeles and San Francisco, as well as to member firms throughout the country. Begun in 1987, Poets was completed on time — and under budget — in July 1990.

Minimum ROI set early

How does the Pacific Stock Exchange determine if an IS project makes good business sense? The first step is to clearly define how the proposed system will solve a particular business problem, Parady explains. During this phase, a minimum rate for return on investment (ROI) is also established, providing an objective yardstick for success.

Only when the business analysis is done is technology discussed. Here again, common sense is the rule. "Our basic criterion is that a system must perform under any and all conditions because if the system goes down, the business goes somewhere else, and the exchange loses money," Parady says.

Another key to the exchange's success is getting users involved early in projects as well as ensuring that IS staff members understand the business issues a system is designed to address.

"We take our systems people, put them out on the trading floor and let them work with the market makers and exchange specialists so that they understand the basics of the business," Parady explains. One-on-one teaching supplements the process, he says.

Besides yielding a high ROI, sticking to business and systems basics has another payoff, Parady says: increased credibility for IS. Recalling Poets' implementation, he says, "It's a nice feeling to be able to come back two years later and say, 'We did what we said we would, and we did it on time.' "

If all of this sounds a lot like the latest IS craze — re-engineering — it's no coincidence. "That's only because we have renamed the basics," Parady explains. "Systems investment is really no different from any other capital investment. It still comes down to focusing on what is good for the business."

JULIA KING

DOWNSIZING: PCs

Savings, teamwork at Turner

When The Turner Corp., a $3 billion international construction firm, threw out its big iron last year, it didn't bargain on promoting teamwork in the process.

The company that invented reinforced concrete 80 years ago set out to build a new technological foundation in 1985. Today, Turner officials say, successful downsizing to a personal computer and local-area network system has yielded both hard and soft benefits.

"When we stopped paying support costs for big iron, we avoided a million dollars per year," says Dick Schell, director of information systems.

Thanks to downsizing, Schell says, IS spending shrunk from more than $5 million in 1985 to about $3 million today. Gone are the $25,000 per month maintenance costs of an IBM 4341 mainframe, plus the $2,500 per month charge to maintain midrange machines. Over the last six years, corporate IS staff has been reduced from 50 employees to 22 employees.

Turner began to look beyond mainframe approaches after officials realized that centralized computing was increasingly unsuited to a highly decentralized company with 40 U.S. offices and 30 more overseas.

With the advent of personal computing in the mid-'80s, Turner's IS department organized meetings between IS and business units to establish cooperative processing as a mutual goal. Department and office managers met with IS to develop a strategy for placing a common platform in the field.

Claudio Edinger

Downsizing *spurred idea-swapping with the business side, Schell says*

The PCs started arriving in 1986, and the "big iron" metamorphosis quickened two years later with the elimination of 25 IBM Series One midrange machines and a nationwide, multidrop leased-lines network.

Today, Turner has 2,000 PCs, mostly Intel Corp. 80386-based machines, on a Banyan Systems, Inc. Vines network. End users run applications ranging from project management to word processing and accounting.

Perhaps even more important than cost savings, Schell says, is the bigger part IS plays in daily business. Downsizing has strengthened partnerships with everyone from the chief executive officer to scattered operating units, he says. And because standards are set at a project's start, there is greater confidence that IS dollars are being well spent.

Like the Pacific Stock Exchange, Turner has discovered that downsizing automatically brings users more into the loop. Technical and business users regularly swap ideas for improvement, which Turner says has boosted individual and business unit productivity.

"When we release a system in-house, we send it out with a bug/enhancement form," explains John Good, Turner's manager of information technology. Problems are fixed promptly, he says, and suggestions filed for review later by IS and divisional management.

Schell says improved teamwork can also blunt the overemphasis on financial paybacks from systems projects.

SALLY CUSACK

RE-ENGINEERING

N.Y. Civil Service revamps

Henry J. Nahal knows firsthand what it's like to be "lost" in a computer system. When he moved into a new job at the New York Department of Civil Service, his records could not be located for six months.

Luckily, Nahal was in a position to help fix things. As director of telecommunications and information management, he is spearheading a far-reaching project to revamp the vast, often cumbersome bureaucracy through technology by constructing a massive statewide client/server network. The goal is to trim costs and improve handling of health insurance for 1.2 million New York state and municipal employees and their dependents.

Reasoning that new technology is sometimes the best solution for old problems, the department — which also serves as a go-between for 31 insurance carriers and more than 50,000 medical providers — decided to make a drastic paradigm shift.

"We are government, and we don't get the opportunity very often to rebuild our infrastructure," Nahal says. "So when we do, we want to go as far as we can."

There was plenty of ground to cover. For years, the department had relied on a Honeywell Bull, Inc. mainframe, paper cards and files and "Sneakernet." The business was no better: The New York State health insurance plan at the time was running a $330 million deficit. To make matters worse, negotiations were under way to implement different copayment plans for each labor union, threatening to further complicate paperwork. State officials decided a close look at both systems and strategy was in order.

Gary Gold

Massive client/server net *helped create $174 million surplus. From left: Josephine Gambino, commissioner; Nahal; and Robert DuBois, director, Employee Benefits Division*

When completed, the setup will include 1,100 Intel Corp. 80386SX-based clients, 15,000 point-of-sale devices, smart cards and several large Intel servers and IBM 3745 front-end processors, all linked by a Banyan Systems, Inc. Vines network. This, in turn, will connect to an IBM 3090 running DB2 in Omaha.

New systems are being phased in through early 1993, although some are already running. Now, when a state employee enters a local personnel office, an administrator logs vital information such as insurer's name, policy number, date of birth, address, etc., on-line onto the DB2 database, where records are automatically updated. Workers are also issued smart cards, which can be automatically updated with key information on benefits and costs.

And even though client/server is cutting-edge technology, Nahal says, the new system costs far less to maintain than the old mainframe. Yearly savings on an eligibility verification system now exceed $1 million, and complex applications can be run with more flexibility.

Those kinds of savings have helped the plan see a $174 million surplus, a dramatic turnaround.

SALLY CUSACK

DOWNSIZING: MIDRANGE

American Legion boosts spending — and savings

The American Legion has proven the old adage about "spending a buck to make a buck." Except that the Indianapolis-based, not-for-profit organization has added a new twist: Spend a buck to *save* a buck.

Back in 1989, the legion knew it would have to replace an aging NCR Corp. Criterion large-scale system used for membership tracking, mailings and other services supporting its 3.1 million members. Much of the custom Cobol software dated back to the mid-1970s.

"We decided to do a real analysis and figure out what type of system would carry us through the 1990s and beyond," says Gary Garver, chief information officer at the American Legion.

So two years ago, the 72-year-old service group called in consultant Price Waterhouse to help develop a new, flexible, integrated system. "We knew the postal rates were going to increase dramatically over the next one to three years, and we had no time to develop software in-house," Garver says.

Requests for proposals went to some 30 software vendors before the legion selected an IBM Application System/400-based membership package from Computer Systems Consultants, Inc. in Landover, Md. The $2 million conversion went smoothly, and today, three AS/400 B series machines handle all membership processing.

The switch-over necessitated an increase in the legion's annual IS budget — $1.8 million in 1990-91 to $2.1 million in the current fiscal year. The 50-member IS department trimmed two staff members during the NCR scrapping, but the increase made possible a two-thirds cut in maintenance costs, Garver says, making it very much worthwhile.

Now, AS/400-based applications and a dozen new Apple Computer, Inc. Macintosh desktop publishing systems help the legion save a million dollars each year in maintenance and camera-ready data production costs. Legion staff members now handle their own mail sorting, bagging and palleting for direct pickup by U.S. Postal Service trucks, which also eliminates costs.

Another $150,000 to $175,000 per year is saved by publishing legion literature in-house instead of contracting work out, as was previously done.

Add to that maintenance savings of approximately $300,000 per year. Even with the $60,000 yearly cost of IBM's five-year extended maintenance plan, the legion figures it's still way ahead.

Beyond economic gain, Garver says, the system frees up the legion to think about higher goals. "We have to figure out ways to use technology to bring more people into community service."

SALLY CUSACK

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Jan. 28-30
San Jose, Calif.
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Macworld Exposition and Conference
Jan. 12-15
San Francisco, Calif.
(617) 361-8000

FEB

Networld
Feb. 11-13
Boston, Mass.
(800) 829-3976
(201) 346-1400

CASE World
Feb. 18-20
Santa Clara, Calif.
(508) 470-3880

MAR

Engineering Workstations Exhibition and Conference/West
March 3-5
Santa Clara, Calif.
(213) 450-0500

Laptop & Palmtop '92
March 9-10
New York, N.Y.
(212) 682-7968

NCGA '92
March 9-12
Anaheim, Calif.
(800) 225-6242
(708) 698-9600

Downsizing Expo
March 10-12
Chicago, Ill.
(508) 470-3870

CeBIT
March 11-18
Hannover, Germany
(609) 987-1202

DB Expo '92
March 24-26
San Francisco, Calif.
(415) 941-8440

Electronic Imaging West
March 24-26
Anaheim, Calif.
(800) 223-7126
(617) 232-3976

FOSE (Federal Office Systems Expo)
March 30 - April 2
Washington, D.C.
(703) 683-8440

APR

Hannover Fair '92
April 1-8
Hannover, Germany
(609) 987-1202

Comdex/Spring '92
April 6-9
Chicago, Ill.
(617) 449-6600

Windows World
April 6-9
Washington, D.C.
(617) 449-6600

Federal Computer Conference/Defense and Government Computer Graphics
April 22-23; Anaheim, Calif.
(800) 343-6944; (301) 961-6575

MAY

Dexpo/Spring
March 5-7
Atlanta, Georgia
(800) 223-7126
(617) 232-3976

Interop/Spring
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(415) 941-3399 x900

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JUNE

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Object World
June 21-26
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AIIM (Association for Information and Image Management)
June 22-25
Anaheim, Calif.
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NOV

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Minneapolis, Minn.
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Comdex/Fall '92
Nov. 16-20
Las Vegas, Nev.
(617) 449-6600

Autofact
Nov. 10-12
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(313) 271-1500

DEC

Multimedia Expo
Dec. 2-4
San Jose, Calif.
(212) 226-4141

Database World Conference & Expo
Dec. 8-10
Chicago, Ill.
(508) 470-3880

Dexpo/Fall
Dec. 8-10
Las Vegas, Nev.
(617) 232-3976

Federal Computer Conference/Defense and Government Computer Graphics
Dec. 8-10; Washington, D.C.
(800) 343-6944; (301) 961-6575

The Customer Driven Company: Moving from Talk to Action
By Richard C. Whiteley
Addison-Wesley Publishing Co., $21.95

This book takes the reader step-by-step through what it takes to make an organization truly customer-driven. Creating intimacy between company and customers is a good profit strategy, Whiteley says. For example, Easton, Pa.-based Binney & Smith, Inc., maker of Crayola crayons and markers, occasionally heard complaints about crayons staining clothing. When the company decided to create a product that answered those complaints — washable Crayola markers — its marker sales doubled.

Every Manager's Guide to Information Technology: A Glossary of Key Terms & Concepts for Today's Business Leaders
By Peter G. W. Keen
Harvard Business School Press, $16.95

If your boss loses patience when you drag out the old "think of the network as a highway" analogy, this is a handy volume to have around. Keen puts technical terms and concepts such as the client/server model into everyday language and untangles commonly confused terms, including "interconnectable" and "interoperable." A dip into these pages could make future conversations with nontechnical managers a lot more pleasant and enlightening.

BEST BOOKS

Cyberpunk: Outlaws and Hackers on the Computer Frontier
By Katie Hafner and John Markoff
Simon & Schuster, Inc., $22.95

Pull up the covers and turn on the nightlight — *Cyberpunk* will chill the blood of the bravest systems operator. The authors recount the stories of three real-life hackers in absorbing detail: Kevin Mitnick, a "phone phreak" who wreaked havoc with computer networks; Pengo, a West Berliner who offered his hacking services to the Soviet government; and Robert T. Morris, author of the Internet virus.

Information systems professionals can find some helpful hints about prevention in these stories.

Job Search for the Technical Professional
By David J. Moore
John Wiley & Sons, Inc., $14.95

If you are looking for a job or just thinking about making a move, this book tells you how to package your talents most effectively, how to network for best results and how to assess and reject offers. It also addresses "legal rights of the technical job seeker," with guidance on how to recognize and deal with discrimination and how to protect your rights in technical creations.

— Compiled by Alan J. Ryan

BOTTOM LINE

▶ **Industry in flux.** Major vendors face a year of change. IBM, Compaq and Lotus will suffer aftershocks of restructuring, while Apple, Novell and Microsoft will fight for acceptance in larger environments. Page 26-27. Plus, see our subway map of industry alliances. Page 24.

▶ **A change in mergers.** Buyouts will continue, but emphasis has shifted from acquiring weak or willing firms to acquiring those offering technological and cultural "synergy." Page 28.

▶ **Court cases are reshaping information systems.** Recent lawsuits will affect many aspects of computing, including software copyrights, third-party service, relicensing fees and personal computer clone prices. Page 29.

▶ **Full agenda on Capitol Hill.** Tax laws and export regulations top a long list of information- and technology-related issues coming before federal and state bodies this year. Page 32.

▶ **Bright lights, hot companies.** Not all of the computer industry is suffering. A host of small, specialized vendors are enjoying annual growth of 200% or more. Page 33.

▶ **The Amazing Outsourcing Game.** Anyone can play, with prizes estimated at $22 billion — the current value of the market, according to researcher Meta Group. Andersen Consulting, EDS, IBM and Computer Sciences Corp. dominate. Page 34.

Swing your partner, do-si-dough

Computer industry alliances continue to be popular, but are they just a fancy dance?

BY JAMES DALY and MICHAEL SULLIVAN-TRAINOR

Kurt Vargo

It was a moment once believed unthinkable: Apple Computer, Inc. Chairman John Sculley stood behind a rostrum in a crowded hotel ballroom pumping the hand of IBM President Jack Kuehler. Cameras clicked, backs were slapped and lavish promises were made as the pair beamed over details of their sweeping technological alliance.

When the hubbub died down, however, buyers were once again left to wonder if another much-ballyhooed alliance — Sculley had described the IBM/Apple pact as a "renaissance in technological innovation" — would really deliver the goods.

Many users have their doubts. "We see a lot of these large alliances as vaporware," says Bill Remmert, an information systems veteran who served as manager of end-user computing at GTE Spacenet before becoming an independent consultant. "If we know it's coming down the road, it can help back up a decision. But we never, never base a strategic decision on them."

Few fruits

Such skepticism can hardly be blamed: Over the last few years, many loudly touted partnerships have proved paper tigers or downright flops. The greatly hyped 1987 Apple and Digital Equipment Corp. pact, for example, took years to bear fruit and then only managed to trickle out a few communications products. The Advanced Computing Environment (ACE) consortium — which includes Compaq Computer Corp., DEC, Mips Computer Systems, Inc. and Microsoft Corp. — also has accomplished little in its drive to develop a high-performance computing platform.

Yet partnerships continue to be popular. In fact, in an industry reeling from mergers, buyouts, bankruptcies and massive layoffs (see chart below), alliances have become the latest, greatest hope for prosperity.

And little wonder: Now that users want to link all kinds of diverse equipment, life is more complex for industry vendors. "Everyone realizes they can't be all things to all men," says Martyn F. Roetter, director of Arthur D. Little, Inc.'s information technology practice. "They are willing to be partners in one segment and fight tooth and nail in the other. It's the new way of life."

When recession flattened much of the computer industry in 1991, many vendors headed for the safety of alliances. "When you're faced with eroding margins, you go for any port in a storm," says Mark Schmidt, vice president of information technology at Wal-Mart Stores, Inc. in Bentonville, Ark.

Competition abroad is also driving partnerships. According to the U.S. Department of Commerce's 1991 "U.S. Industrial Outlook," strategic alliances with foreign companies will probably increase as U.S. firms seek out partners in Europe and Asia to share mounting research and development costs and gain access to low-cost, high-volume manufacturing capacity.

Dozens of big alliances have been formed during the last 12 months, including IBM and Apple, DEC and Microsoft, Apple and Information

Continued on page 25

Body count

A look at the January rosters shows that many major computer makers will start 1992 much slimmer than 12 months ago

Apple	Compaq	DEC	Lotus	Hewlett-Packard
1992: 12,600 1991: 15,600	1992: 10,300 1991: 12,000	1992: 115,000 1991: 121,000	1992: 3,800-3,900 1991: 3,538	1992: 89,000 1991: 92,000
Down: 3,000	**Down: 1,700***	**Down: 6,000**	**Up: 262-362****	**Down: 3,000***

IBM	Prime	Seagate	Unisys	Wang
1992: 353,000 1991: 373,000 (worldwide)	1992: 7,100 1991: 8,000 (worldwide)	1992: 38,000 1991: 40,000	1992: 61,000 1991: 75,300	1992: 14,000 1991: 18,700
Down: 20,000*	**Down: 900***	**Down: 2,000**	**Down: 14,300**	**Down: 4,700**

(Number of employees)

* Includes only departures due to layoffs, early retirements and voluntary severance incentives. All others reflect total departures for any reason.

** Includes 300- to 400-employee layoff in Q1 '92.

CW Research: Stefanie McCann

CW Chart: Marie Haines

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A guide for rapid transit through today's interconnected computer industry

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- Strategic alliance
- Equity partnership
- Joint venture partnership
- Inactive strategic alliance
- Lawsuit

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Stratus

Motorola

Computer Associates

Novell (DRI)

Compaq

IBM

Borland (Ashton-Tate)

Apple

Olivetti

Lotus (CC:Mail)

Intel

DEC

Platform Partners:
- NAS
- EMA
- Pathworks

SAA Partners:
- Systemview
- AD/Cycle
- Information Warehouse

Systems Center

Microsoft

Tandy

Sybase

HP (Apollo)

Sun

AT&T (NCR)

Accumaster Partners

Compiled by Jodie Naze. Design: Tom Monahan. *Note: Graphic shows representative alliances and is not intended to be comprehensive.*

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60. Government - State/Federal/Locel
65. Communications Systeme/Public Utilities/ Transportation
70. Mining/Construction/Petroleum/Refining/Agric.
80. Menufacturer of Computers, Computer-Releted Systems or Peripherels
85. System Integretors, VARs, Computer Service Bureaus, Software Plenning & Consulting Services
90. Computer/Peripheral Deeler/Distr./Retailer
75. User: Other _____
95. Vendor: Other _____
(Pleese specify)

2. TITLE/FUNCTION (Circle one)
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21. Dir./Mgr. MIS Services, Informetion Center
22. Dir./Mgr. Tech. Plenning, Adm. Svcs., Dete Comm. Network Sys. Mgt.; LAN Mgr., PC Mgr.
23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Mgrs., Suprv. of Programming, Software Dev.
32. Progremmers, Software Developers
60. Sys. Integrators/VARs/Consulting Mgt.

OTHER COMPANY MANAGEMENT
11. President, Owner/Pertner, General Mgr.
12. Vice President, Asst. VP
13. Treasurer, Controller, Finencial Officer
41. Engineering, Scientific, R&D, Tech. Mgt.
51. Sales & Mktg. Menegemant

OTHER PROFESSIONALS
70. Medical, Legel, Accounting Mgt.
80. Educetor, Journalists, Libreriens, Students
90. Others _____
(Pleese specify)

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Partnerships continue to swing around the industry

CONTINUED FROM PAGE 21

Builders, Inc., and Novell and IBM (see chart at left for details). Industry observers expect an equal or larger number in '92, especially in the hard-pressed personal computer industry.

"There's still a lot of consolidation coming," predicts Safi Qureshy, president of AST Research, Inc., a PC maker.

But amid all this activity, larger questions loom: What effect will the growing number of partnerships have on computer buyers? On the future of technology? On the vendors themselves?

Analysts and users agree the answers will have far-reaching impact on all U.S. business for years to come — starting now. Predictably, opinions vary.

Some financial analysts say they see the urge to partner as positive. "Companies are trying to add more value to their products, while adding in as little overhead as possible," says Laura Conigliaro, computer industry analyst at Prudential Securities, Inc. "Partnerships are one way to do that, and we'll see many, many more."

The general attitude is more cautious, however. "Users are evaluating the partnerships one by one, trying to figure out the permutations and combinations," says Robert Tasker, vice president of International Data Corp., a Framingham, Mass.-based research firm.

Experts agree the outcome of partnerships varies greatly according to the original purpose. Generally, the team-ups can be broken into three categories.

■ Technology alliances: High hopes.

In technology alliances, partners agree to create new products or technology by combining research and development efforts. Example: IBM and Apple, IBM and Borland International, Inc., DEC and Novell.

Raised hopes are among the biggest fruits of technology pacts. "Hot partnerships can offer dramatic opportunities for new technology developments," Conigliaro says.

These deals also can affect the offerings of competitors trying to stay abreast of new technologies. Apple and IBM's plans to build an object-oriented operating system, to name one recent example, is undoubtedly being heard within the R&D labs at Microsoft, now busily preparing its next-generation DOS 6.0.

"When one vendor moves, it keeps the others on their toes," says Jeff Van Skyhawk, manager of end-user services at Bose Corp. in Framingham, Mass.

Of course, technology alliances also carry great risk, because exciting new frontiers may not pan out into popular products. A classic case of a high-flying union that crashed and burned is IBM and Microsoft's joint development of OS/2.

Another risk is that collaborating vendors may inadvertently strengthen a competitor by sharing revenue and design secrets. That's exactly what happened when Apple joined with Sony Corp. to build a next-generation laptop.

Both companies exchanged R&D information that otherwise would have been kept secret.

■ Strategic alliances: The price is righter.

In strategic alliances, partners join together to market current products or improve compatibility. Example: IBM and Novell.

What partnerships can produce

Best case

- Lower priced products
- Integration of key technologies
- Better product functionality
- Shorter buy lists
- Progress toward open systems

Worst case

- Withering of established and widely installed products
- Waste of user and vendor energy
- Confusion of product direction
- Lip service to open systems

While specific results obviously depend on the type of union and companies involved, experts say the biggest immediate effect of strategic alliances is lower prices. Partners may rethink marketing plans, while competitors may offer similar products at a discount in hopes of stealing some thunder.

While that's good news for users, ultimately it may not mean much. "We'll save a few dollars here or there," says Mike Bailey, a systems integrator at Lockheed Missiles and Space Co. in Sunnyvale, Calif. "But most of these unions don't mean a thing to us."

Occasionally, however, the impact of a strategic team-up can be both swift *and* far-reaching — particularly for users struggling to make sense of a bewildering multivendor environment.

Recently, for example, Apple has aggressively used licensing agreements for its Data Access Language (DAL) — connectivity software that lets Macintosh users access relational database information from servers or hosts — to create partnerships. That was good news for Gary Gray, chief of management systems at the Marshall Flight Center in Huntsville, Ala. Gray says he enjoyed the benefits from DAL pacts early by getting an easy way to unite information from a wide variety of hosts, including DEC, Data General Corp., Hewlett-Packard Co., IBM and Cray Research, Inc.

■ Standards alliances: Safety in numbers.

In standards alliances, partners agree to create industry standards for technologies sold by multiple vendors. Examples: The Open Software Foundation (OSF) and Unix International.

Most standards pacts today involve some version of open systems (see story page 36). Vendors try to convince buyers that their participation signals a willingness to merge proprietary architectures or technologies, thus advancing open systems efforts.

Ironically for their part, users don't necessarily applaud these kinds of standards partnerships. Many, in fact, are dead set against them. "Rather than making two proprietary environments interoperate better," says Jerry Johnson, standards analyst at the Department of Information Resources for the state of Texas in Austin, vendors "should migrate the products to a strategically open environment."

Many open systems proponents also feel burned by the "partner by the hundreds" trend, which so far has resulted mainly in competing consortia, such as the OSF vs. Unix International and ACE vs. Sparc.

"I'm wondering how much time and effort we're wasting coming up with two different approaches to the [Unix] interface," says Johnson in reference to the OSF vs. Unix International. "Defending and assessing the differences is wasting money and stifling further development."

A completely different pairing — users and vendors — could be the best way to bring about an eventual migration to open systems, according to Duane Elms, program manager for technical computing at General Electric Co.

"If there are enough of us involved, the vendors can be overwhelmed. We can make sure they never have a moment's peace on these issues," Elms says.

What's the bottom line of all this action for 1992? Keep a wary eye on the enthusiastic roar of partnerships.

"A product that comes out of an alliance is like one from any organization," Elms says. "You have to have your eyes open and know its position in the market. There's nothing inherent in alliances that enable them to produce better products."

Frank Gens, vice president of technology assessment at Technology Investment Strategies Corp. in Framingham, Mass., advises buyers to avoid "promise" alliances in favor of "product" teams pushing firmer standards with an established base.

PARTNER GUIDE

Following are short descriptions of vendor alliances depicted in chart (opposite page)

- **Apple Computer, Inc. — CA:** Licensing pact gives Mac users access to CA mainframe software. CA licenses DAL, will develop and distribute Apple client/server software. **DEC:** Mac client access to All-In-1 services. **HP:** Pending lawsuit, charging HP/Microsoft with copying Mac interface. **IBM:** Jointly developing new PC operating system, better network links. Joint partners in independent companies Kaleida (multimedia) and Taligent (platform-independent object-based software). **Microsoft:** Collaborated on Truetype font technology. Apple will use in System 7.0; Microsoft, in Windows 3.1. Lawsuit, see HP (above). **Motorola:** With IBM, agreement to develop family of Power PC RISC processors.

- **AT&T. — Accumaster partners:** Develop products for AT&T's network management suite. **IBM:** Links between network management systems. **Systems Center:** Links to DEC network management.

- **Borland International, Inc. — IBM:** Will develop OOP languages, development tools for OS/2 2.0 as well as next generation of Objectvision, a visual programming tool. **Lotus:** Pending lawsuit charging Borland with copying 1-2-3 menu structure. **Microsoft:** Ashton-Tate agreement to distribute SQL Server.

- **Compaq Computer Corp. — Microsoft/Novell:** Alliance to establish more formal framework to support multivendor PC-based solutions.

- **Computer Associates International, Inc. — DEC:** Codeveloping systems management software to run in VAX/VMS. **HP:** Codeveloping software for HP-UX. **IBM:** Business partner on midrange platforms, one of original SAA vendors. IBM endorses CA '90s (see Apple).

- **Digital Equipment Corp. — Microsoft:** Jointly developing Windows-based client/server products, including integration of Pathworks and Windows 3.0. **Novell:** Links between network management environments. **Olivetti:** Reseller agreement. **Tandy:** Jointly developing client/server systems; reseller agreement. **Platform partners:** Vendors developing for DEC architectures. **Systems Center:** Links to AT&T network management (see Apple, CA).

- **Hewlett-Packard Co. — Novell:** Netware will run native on HP RISC chip. **Microsoft:** Cooperating in future design of OLE for Windows to ensure compatibility with New Wave; Unix version LAN Manager. **Sun:** Alliance to develop multiplatform, object-oriented operating system to compete with ACE, Apple/IBM (see Apple, CA).

- **IBM. — Intel:** Joint technology agreement to cooperate on chip design. **Lotus:** Incorporating Notes into Officevision LAN 2.0. **Microsoft:** Windows endorsement, now in question. **Motorola:** Joint partnership to develop interactive Ardis packet radio network (also, see Apple). **Novell:** Reseller agreement with Netware. Also, better integrating Netware with IBM. **Equity partnerships:** Includes Wang, American Management Systems, Computer Task Group. **SAA partners:** Vendors agree to support SAA protocols. **Stratus:** Reseller agreement. **Sybase:** SQL links (see Apple, AT&T, Borland).

- **Intel Corp.** (see IBM).

- **Lotus Development Corp. — Sybase:** Lotus owns minority equity interest (15%). Agreement includes provisions for Sybase to sell additional 10% to Lotus at future date (see Apple, Borland, IBM).

- **Microsoft Corp. — Sybase:** Jointly developed SQL Server (see Borland, Compaq, DEC, HP, IBM, Intel).

- **Motorola Corp.** (see Apple, IBM).

- **Novell, Inc.** (see Compaq, DEC, IBM).

- **Olivetti.** (see DEC).

- **Sun Microsystems, Inc.** (see HP).

- **Stratus.** (see IBM).

- **Sybase, Inc.** (see IBM, Lotus, Microsoft).

- **Tandy Corp.** (see DEC).

An industry in turmoil

This year won't be for the faint of heart. Change and new directions — some radical — will be in store for many computer firms. Companies that created their own markets — such as Lotus Development Corp. and IBM — will restructure and diversify in hopes of keeping leadership positions. Others that have made their mark in the personal computer world — including Apple Computer, Inc., Novell, Inc. and Microsoft Corp. — will continue to strive for acceptance in larger environments. And once-proprietary vendors — such as Digital Equipment Corp., Sun Microsystems, Inc. and Data General Corp. — will try to advance into the commercial open systems market. Stay tuned.

Company and CEO	Biggest challenges	Key strategies	Key product rollouts	Outlook
Apple Computer, Inc John Sculley	Expand power, range, connectivity of Macintosh to appeal to corporate IS. Demonstrate progress in high-profile alliance with IBM.	Reduce production costs, prices, time-to-market on all products. Pursue technological alliances to expand Macintosh corporate connectivity and saleability. Rapidly evolve System 7.0 architecture. Beef up client/server integration through increased licensing of Data Access Language, which lets users access relational database information from server or host. Continue work with IBM to create object-oriented operating system.	System 7.1 scheduled to ship first quarter. Lighter Powerbooks (as small as 3½ pounds) by midyear. Ongoing releases with IBM of connectivity products to connect both makers' platforms. The 16-MHz 68030-based Macintosh LC by summer. Macintosh IISI successor with faster 68030 chip, priced below $3,000. Color version of Classic II, priced below $2,000, by year's end. Performance upgrades to Quadra 700 and 900 in early fall.	"What Apple needs [what Apple wants] is a revolutionary new platform and system to carry it through into the next century. But Apple can't do it alone." — Pieter Hartsook, editor, "The Hartsook Letter," a Macintosh-centric newsletter in Alameda, Calif.
AT&T Robert Allen	Realize promise of Open Cooperative Computing (OCC) architecture introduced last February. Finish assimilation of NCR organization, marketing, R&D and products.	Continue to merge NCR and AT&T product lines, establish reseller relationships, find customers to prove value of open systems computing at commercial sites.	Commercial version of Cooperation distributed work-flow software. Volume shipments of System 3600 by second quarter. First delivery of top-of-the-line System 3700.	"The concepts of [OCC] need to be buttressed by real products." — Tom L. Nolle, president, CIMI Corp., Voorhees, N.J.
Banyan Systems, Inc. David C. Mahoney	Use Vines network operating system to halt eroding share against market leader Novell. Ease user worries that the $100 million company will be acquired, go public or lack funds to enhance Vines without courting small and medium-size sites.	Increase use of Vines through continued alliances with key open systems vendors, including OSF; participation in major consortia; compliance with networking and management standards. Port servers to other platforms beyond Banyan's proprietary version of Unix.	Products supporting Unix clients on Vines. Integrated package combining security and wide-area enhancements of Vines 4.11 and Apple Macintosh client support of Vines 5.0. Third-party router company support of Vines protocol. Possible: Vines versions for OSF/1 version of Unix; high-end workstations from Sun Microsystems, Hewlett-Packard/Apollo.	"I don't see Novell's dominance faltering unless the firm should stumble on network management or directory services." — Mary Modahl, director of network strategy research, Forrester Research, Inc., Cambridge, Mass.
Compaq Computer Corp. Eckhard Pfeiffer	Survive restructuring, execute new distribution strategies, maintain reputation as high-quality producer.	Expand focus to encompass mass market and low-end, low-margin hardware products. Build new distribution channels outside traditional dealer channel. Maintain high-end systems development and roll out first ACE RISC-based products. Cut costs and maintain quality.	Low-end desktop and notebook systems, including follow-ons based on 486SX and 386SL chips. High-end, four-processor Systempros. First ACE products, plus a pen-based system, by year's end.	"The question is: Can they execute within the time frame necessary? If they do, they win big. If they don't, they get relegated to being just another clone maker." — John Dunkle, vice president, Workgroup Technologies, Inc., Hampton, N.H.
Computer Associates International, Inc. Charles Wang	Continue to modify sales efforts in hopes of boosting current average of five packages per customer.	Push PC software to achieve greater low-end visibility. Digest recent acquisitions (On-Line Software and Pansophic), keep customers happy while pursuing other acquisitions. Meet projection that Unix will account for one-third of revenue by mid-1990s.	Unix systems and applications packages. Enhancements of major mainframe families, including databases and systems. CASE tools, introduced in October, slated for general availability around mid-1992.	"Unix will contribute to a whole new story for CA. They'll be able to tell customers they can keep their investment in existing software and use open systems, too." — Terence Quinn, software analyst, Kidder, Peabody & Co., New York.
Data General Corp. Ronald L. Skates	Grow Unix-based RISC Aviion servers while continuing to enhance, support MV/Eclipse products.	Develop high-end commercial applications in vertical markets for the Aviion line. Actively pursue relationships with third-party software vendors.	New MV systems. New Aviion servers to supplement both high and low ends.	"In 1991, DG stabilized its revenues and product lines. In 1992, they must drastically increase Aviion shipments to offset a potential erosion of the proprietary time-share systems." — William M. Bluestein, senior analyst, Forrester Research, Inc., Cambridge, Mass.
Digital Equipment Corp. Kenneth H. Olsen	Retain market share. Keep installed base satisfied with latest VAX/VMS products while customers await RISC-based Alpha VAX line later in year.	Convince new and old customers of seriousness of open systems strategy. Continue growth of software, services, systems integration businesses to offset declines in hardware profit margins.	Better packaged and integrated Network Application Support software. More powerful, price-competitive VAXs running under new CMOS chip. By mid-1992, first Unix-based workstations complying with ACE alliance standards.	"DEC needs a really big success in 1992 to make it a hot company again." — David Evancha, analyst, Workgroup Technologies, Inc., Hampton, N.H.

Company and CEO	Biggest challenges	Key strategies	Key product rollouts	Outlook
Groupe Bull Francis Lorentz	Return to profitability by year's end, continue development of both open and proprietary products, improve customer service.	Consolidate factories, reorganize worldwide sales and service operations. Carry out major systems integration thrust. Continue to refine Distributed Computing Model, Bull's strategy to combine proprietary and open products.	Computer-aided software engineering products, probably in first quarter.	"Bull needs to restructure its organization in line with products developed out of its transformation plan." — Steve Josselyn, senior analyst, International Data Corp., Framingham, Mass.
Hewlett-Packard Co. John Young	Continue efforts to match product quality with marketing quality.	Continue selling both proprietary and open systems hardware from PCs to high end, while improving support for all. Work with Sun, Microsoft to develop object-oriented software. Hold lead position in workstation price/performance against IBM, Sun.	Workstations under $10,000 and over 50 MIPS. Laser and ink-jet printers in $200 to $1,000 range. Posix programmer interface on proprietary operating system.	"I'm not optimistic about the personal computer side, but their workstations will do well." — Tom Kucharvy, analyst, Summit Strategies, Boston.
IBM John Akers	Execute massive restructuring plans unveiled in December. Demonstrate progress in high-profile alliance with Apple. Convince more users of mainframe's critical role in enterprisewide computing.	Push ahead with nimbler, more autonomous product units, while avoiding conflict and confusion between them. Deliver on promises for open systems support, including System/390 architecture. Gain credibility with OS/2. Support of open systems initiatives, including Posix, Open Software Foundation's Distributed Computing Environment.	OS/2 2.0, scheduled for March. Several lower end, new generation ES/9000 mainframes. Continued price/performance upgrades for AS/400, including three-way processor by midyear. Delivery of long-awaited low-end RS/6000 for under $10,000.	"The unfortunate thing is that changing organizational charts is easy, and changing behavior is a long-term, difficult process." — Frank Gens, analyst, Technology Investment Strategies Corp., Framingham, Mass.
Lotus Development Corp. Jim Manzi	Halt slipping sales of market-leading spreadsheet. Strengthen and expand nonspreadsheet products such as groupware by shifting resources into promising areas. Continue restructuring to reduce costs.	Help IBM engineer reversal of fortune for Officevision LAN and OS/2. Gain market presence and respect in Macintosh market. Simplify upgrade process. Get IS consulting services going. Develop and expand Notes, quickly roll out suite of Windows products. Buy, build or back leading desktop database engine. Continue efforts on E-mail messaging protocol standards.	Notes groupware, including traditional applications/facilities such as database access, E-mail, message tools and Chronicle groupware spreadsheet. Work with IBM on Officevision. 1-2-3 for Macintosh, new version for Windows plus Improv for Windows.	"As they come out of the year, they'll be in a much better position, assuming they follow through with the [restructuring] plan. They'll see strong growth in communications, and they seem to be on the right track with Notes. But spreadsheets and Windows will remain in the forefront next year." — Mary McCaffrey, analyst, C. J. Lawrence., New York.
Microsoft Corp. Bill Gates	Leverage Windows 3.0 as leading desktop operating system and mission-critical applications platform. Gain acceptance of networking users and corporate IS. Defuse Federal Trade Commission investigation of unfair or monopolistic trading practices. Deflate image as PC industry bully.	Get Windows New Technology out to beat OS/2 2.0. Strengthen Windows' ease of installation, learning, performance and stability. Push development in pen-based computing, multimedia and E-mail. Improve LAN Manager to compete with Netware. Ramp up Network Courier E-mail package to compete with Lotus. Sell refocused consulting business to corporate IS. Push SQL Server.	Windows 3.1, due out around March. New Technology due out by midyear, followed by software developer's kit by year's end. Technology for Excel to run 1-2-3 macros, due in the first half of the year. Software developer's kit for the Open Database Connectivity application programming interface and related drivers. Pen for Windows Computing pen-based operating system.	"Microsoft is facing a number of challenges. The FTC investigations and the Apple lawsuit are numbers 1, 2, 3, 4 and 5. Either one of them could deliver a severe body blow. There are people thinking that if OS/2 2.0 is good enough, there could be enough of a defection rate [from DOS] to make it an annoyance. Novell is also eating their lunch on the networking side. They have plenty to keep them honest." — Robert Kleiber, research analyst, Piper, Jaffray and Hopwood, Minneapolis.
Novell, Inc. Ray Noorda	Migrate customers of market-leading Netware Version 2 to Version 3. Convince buyers its PC network operating system is reliable enough for company-wide use.	Chase Banyan from large IS shops by matching Vines features, including naming service. Develop Netware connectivity for all heterogeneous hardware and software environments. Possible: Capitalize on new partnership with Digital Research to offer MS-DOS alternative. Continue work with IBM to tighten links with Netview.	Netware 3.2, slated for delivery by year's end. Possible: Patentable new technology allowing Netware to work with OS/2 and AIX on servers.	"Novell will continue to introduce high-end solutions geared toward more enterprisewide networking and internetworking." — Michael Heylin, analyst, Creative Strategies Research International, Inc., Santa, Clara, Calif.
Sun Microsystems, Inc. Scott McNealy	Provide fully functioning Solaris 2.0 operating system by midyear to meet or beat competing ACE system to market. Get chip partners to provide next-generation Sparc CPU for multiprocessing and high MIPS/Specmark ratings. Establish presence in commercial open systems market.	Use operating system, developer tools and networking subsidiaries to spread Sparc architecture among clones and compatibles. Keep lock on low-cost workstation market while moving into commercial sites.	Fully functioning Sparc multiprocessor. Low-cost ($5,000 to $10,000) Sparcstation in 50- to 80-MIPS range.	"They've got to rejuvenate the Sparc clone market — it's just not taking off the way they want." — Dave Smith, analyst, International Data Corp., Framingham, Mass.
Unisys Corp. James A. Unruh	Continue successful programs to sell assets and slash $3 billion debt. Generate more cash from profits. Expand sales to existing base by focusing on financial services, communications, airlines and government.	Further consolidate product line. Continue to improve manufacturing infrastructure, reduce production costs. Push new high-end 2200/900 mainframe as hub processor for on-line transaction processing. Introduce migration strategies and tools for "de-emphasized" V series and System/80 mainframes.	More common peripherals and software for 1100/2200 mainframes. Expected: new item and check image processing products for banks.	"At this point, I think they've done all the reductions they dare do." — George Lindamood, Gartner Group, Inc., Stamford, Conn.

Mergers: Not a big deal in 1992?

BY NELL MARGOLIS

Mergermania, an ongoing drama in the computer industry of late, will play on in 1992. But as the mergers click in, the mania is largely missing.

"Deals that used to grow out of a sense of shared optimism now seem to be motivated by a sense of shared desperation," says Richard A. Shaffer, who is editor of the "Computerletter" newsletter.

Desperate times are making for a more mature approach to mergers, notes Harvey Popell, a principal at investment banking and consulting firm Broadview Associates in Fort Lee, N.J.

Popell says focus has shifted from snapping up weaker or willing firms to shopping for good technological and cultural "synergy." Shaffer adds: "One of the things we've all come to realize over the past several years is that, more often than not, these dazzling mergers don't work."

A good example is the vaunted merger of super-workstation vendors Stellar Computer, Inc. and Ardent Computer Corp. into Stardent Computer, Inc. Billed as an ultimate "merger of equals," the deal degenerated into an ugly set of lawsuits.

So as the new year dawns, the question is this: Will '91's most stunning buyouts — AT&T/NCR Corp. and Borland International, Inc./Ashton-Tate Corp. — bolster confidence or promote more conservatism?

AT&T: Hands on or off?

"NCR had already turned itself around" by the time it was acquired, Shaffer says. "The question now is, will AT&T leave it alone to take its strategy forward?"

It will if it's smart, says Norman Weizer, a computer industry analyst at Cambridge, Mass.-based management consulting firm Arthur D. Little, Inc.

Weizer sees the NCR deal as AT&T's last stand in the computer industry. "The synergy is there: NCR has taken some bold risks, and AT&T's deep pockets should help fund them," he says, adding that the communications giant made the right investment. "The challenge is, can they leverage it?"

Either way, analysts say users could benefit from the technological innovation and pressures on competitors that the pairing will bring.

The coming months will also show the fate of the Borland/Ashton-Tate merger. Some have upbeat expectations. "If Ashton-Tate didn't destroy itself — after years of trying awfully hard," he reasons, "I don't see what Borland is going to do."

The major question, says Nancy McSharry, an analyst at International Data Corp. in San Jose, Calif., is how soon — and how well — Borland can digest its catch.

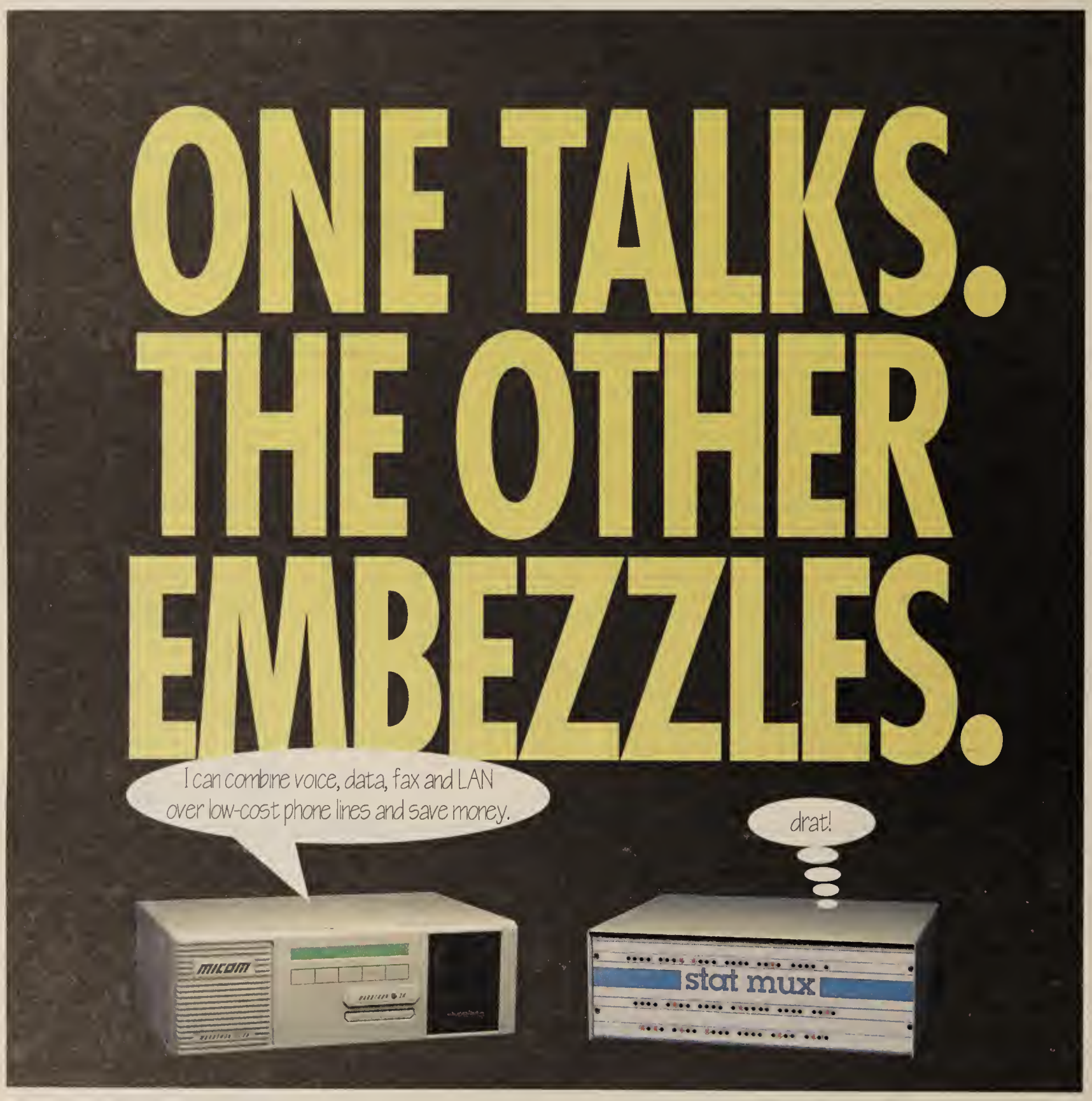
While the merger gives users a simplified personal computer database market and an alternative to Oracle Corp., McSharry says, it also catapults Borland from a $190 million or so company to one of about $500 million overnight. "Managing that won't be easy," she says.

Several other 1991 deals may have lasting reverberations in 1992 and beyond. Computer Associates International, Inc.'s acquisition of Pansophic Systems, Inc. marked the Grand Acquisitor's self-proclaimed return to shopping mode.

Will CA buy its way through 1992? "How else are they going to grow?" Broadview principal Alec Ellison asks.

Novell, Inc.'s purchase of DR DOS-maker Digital Research, Inc. positions it to give Microsoft Corp. a serious run for its money, McSharry says.

"Novell is pitching its battle on Microsoft's turf — the PC operating system," Ellison says. "That's a gutsy move."



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Court cases that will change your job

Mark Steele

BY MITCH BETTS
AND KIM S. NASH

It will be more important than ever for computing professionals to keep an eye on the courtrooms this year. Some cases will have a big effect on the basic relationship between user and vendor, such as Eastman Kodak Co.'s antitrust case and *IBM* v. *Comdisco, Inc.* Users may also want to stay abreast of developments involving intellectual property issues.

Some long-standing copyright infringement cases between vendors will continue in 1992. These include *Lotus Development Corp.* v. *Borland International, Inc.* and *Apple Computer, Inc.* v. *Hewlett-Packard Co. and Microsoft Corp.*

Here are some details about the important cases to follow:

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Case: *Eastman Kodak Co.* v. *Image Technical Services, Inc.;* **U.S. Supreme Court.**
At issue: Kodak refuses to provide copier parts to independent service firms, claiming it needs to protect its service business and maintain quality control. Can a high-tech company monopolize the aftermarket for servicing its equipment?
Status: Pending.
Impact: Kodak's supporters — including many large computer manufacturers — argue that customers (and vendor reputations) will be hurt if they get poor service from unauthorized providers. Independent service firms contend users will get lower prices if more competition is allowed.

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Case: *Feist Publications, Inc.* v. *Rural Telephone Service Co.;* **U.S. Supreme Court.**
At issue: Feist recompiled Rural Telephone's white-pages directory without permission. Can the compilation of raw facts be copyrighted?
Status: Decided in Feist's favor. The judge ruled that databases need some creative assembly and arrangement, not a simple alphabetical list, to qualify for copyright protection.
Impact: The ruling jeopardizes the ability of an information services company to protect its factual databases from being duplicated. However, users can continue to protect their own corporate databases (such as customer lists) by treating them as trade secrets and by writing confidentiality clauses into contracts.

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Case: *First Nationwide Bank* v. *Florida Software Services, Inc.;* **U.S. District Court for the Middle District of Florida.**
At issue: The bank refused to pay sharply higher re-licensing fees for software obtained when it absorbed two failed savings and loans. The vendor said continued use of the software violated an "antiassignment" clause in the original software license, which prohibited transferring the software to a successor company.
Status: Decided in the bank's favor. Court ruled that enforcing an antiassignment clause for the sole purpose of charging new or higher fees is unreasonable and unfair under the Uniform Commercial Code.
Impact: The ruling sets a precedent limiting antiassignment clauses in every state except Louisiana.

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Case: *Retail Systems, Inc.* v. *CNA Insurance Cos.;* **Minnesota Court of Appeals.**
At issue: Retail Systems, a service bureau, lost a computer tape from the Independent Republican Party of Minnesota and tried to shift the liability to CNA, its insurance company. Is the insurance company liable for damages?
Status: Decided in Retail Systems' favor. Judge ruled that computer tapes storing valuable data are covered under the bureau's insurance policy for property damage.
Impact: Electronic data is property covered under common business insurance. Users should make sure there is insurance coverage wherever computer data is kept.

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Case: *Advanced Micro Devices, Inc. (AMD)* v. *Intel Corp.;* **U.S. District Court for the Northern District of California.**
At issue: AMD filed a suit in September claiming Intel breached a contract allowing it to license Intel's chip technologies. AMD also says Intel coerced PC makers to use Intel chips instead of AMD chips.

Did Intel try to establish a monopoly in the chip peripheral and chip markets for IBM-compatible PCs?
Status: Pending.
Impact: If AMD wins — and if its clones are found to be legal copies, based on technology rightfully licensed from Intel through 1995 — users may benefit from lower PC prices, but AMD will need up to a year to ramp-up clone production to levels that would cause prices to fall. If Intel wins, it will have no incentive to make chip prices competitive.

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Case: *IBM* v. *Comdisco, Inc.;* **Court of Chancery of the State of Delaware.**
At issue: IBM filed suit in mid-October on behalf of its leasing unit, IBM Credit Corp., charging Comdisco with allegedly copying and subleasing IBM memory boards for 3090 mainframes. Comdisco maintains that computer parts with the same stock numbers are interchangeable, and therefore, it is OK to take systems apart and reconfigure them.
Status: Pending.
Impact: If IBM wins, users may have to shell out more money for memory devices when leasing or buying second-hand mainframes. If Comdisco wins, more lessors would be inclined to do the same, probably driving down lease equipment prices.

Of special note to users is that IBM named a few Comdisco clients in its suit, such as Electronic Data Systems Corp. and Amoco Corp., which may have to share legal fees.

The following computer-law experts assisted with research and analysis: L. J. Kutten, publisher of the "Software Law Bulletin" in Wayne, Penn., and Esther Roditti Schachter, publisher of the "Computer Law & Tax Report" in New York.

Wish list: Partnerships they'd love to see

Which vendors would you like to see become partners in 1992? *Computerworld* staff members Jim Nash and Stefanie McCann asked several users and industry analysts for their dream teams.

▶**Borland International, Inc. and Macromind, Inc.**
Sheldon Laube, *national director of information and technology, Price Waterhouse, Baltimore.*
Macromind, according to Laube, has two of the best multimedia products on the market. "Borland is an aggressive company and a leader in database software, but they need multimedia to fill out their product line," he says.

▶**3Com Corp. and Novell**
Mike Butler, *airport automation manager, Palm Beach International Airport, Palm Beach, Fla.*
What? Pair these once-bitter rivals? 3Com dropped out of the LAN fight to tackle wide-area internetworking. But Butler has a pretty convincing argument to bring them back into the ring. "You get the people that do connectivity well [3Com] with the people that have a great network operating system [Novell]," he says.

▶**Lotus Development Corp. and Borland**
Vaughan Merlyn, *partner at Ernst and Young's Center for Information Technology and Strategy, Boston.*
"They are two real big powerhouses in the software industry," Merlyn notes. "Together they could be a big force against Microsoft and Computer Associates by marketing both of their software products."

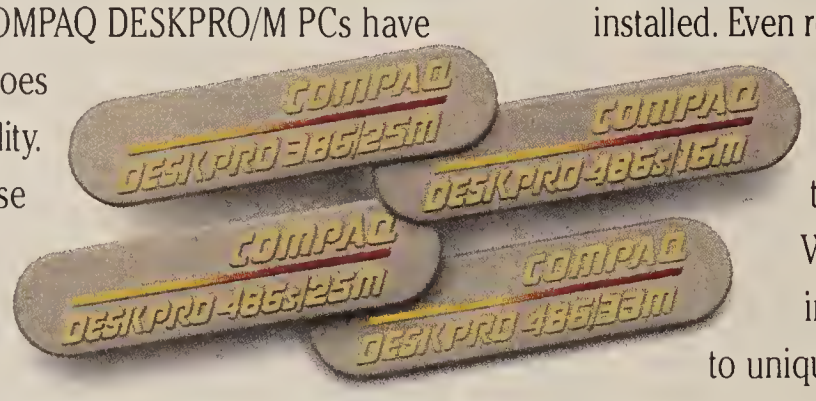
▶**Microsoft Corp. and Novell, Inc.**
Frank and Catherine Dzubeck, *president and executive vice president, Communications Network Architects, Inc., consulting firm, Washington, D.C.*
Both Dzubecks agree this pairing would forever explode the myth that local-area networks are toylike tools suited only for departments or divisions. "Together they would literally become the IBM of networking," Frank Dzubeck says.

▶**IBM and Banyan Systems, Inc.**
David Ferris, *president, Ferris Networks, Inc., market analysis firm, San Francisco.*
A fantasy marriage of brain and brawn. Ferris says the world would be a better place if IBM mingled Vines, Banyan's network operating system, with Big Blue hardware. "IBM would bring great [marketing] wealth to Banyan's technology."

▶**Novell and Digital Equipment Corp.**
Kris Gronert, *senior telecommunications analyst, Quaker Oats Corp., Chicago.*
A case of symbiotic simplicity. "Novell has the best network operating system but poor connectivity," he reasons. "DEC has some of the best connectivity but a poor network operating system." Simple.

Everything you need to know about the difference between a Compaq PC with Intelligent Modularity and a merely upgradable PC.

These days, a lot of personal computers have upgradable processors and memory. But the new COMPAQ DESKPRO/M PCs have Intelligent Modularity, which goes far beyond ordinary upgradability. This unique design makes these PCs a smart investment for today and tomorrow.



Suggested Resale Price starts at just over $3,000 for this family of four remarkable PCs.

Smart for today—designed for today's needs and today's budgets. Intelligent Modularity puts all vital subsystems on separate boards so you can choose just the performance and features you need.

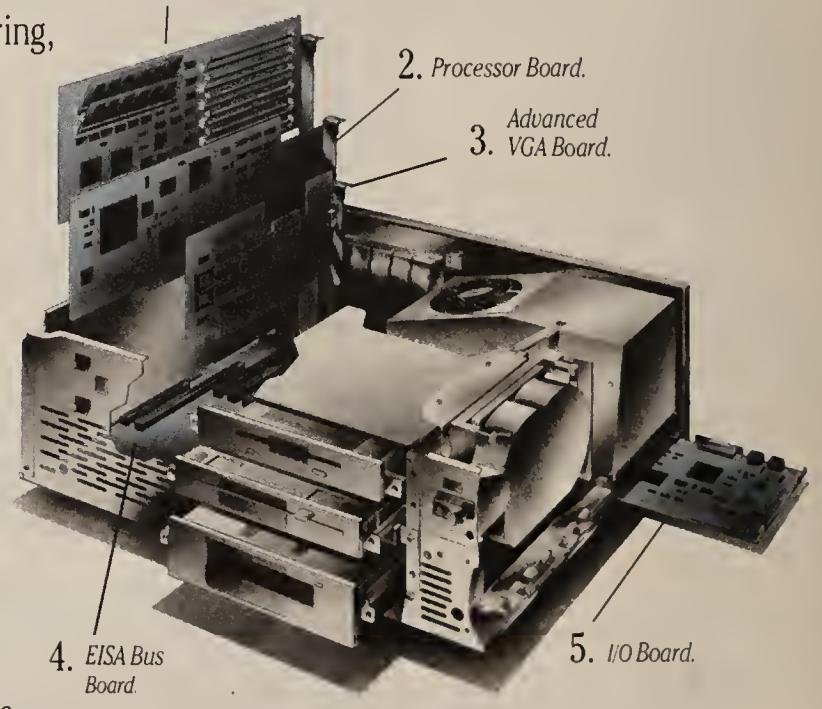
Since the parts are interchangeable, the whole office can standardize on one platform. And since the parts are easy to access, they're easy and inexpensive to service. Replacement parts cost less, too.

Nobody else gives you all the advantages you get with the COMPAQ DESKPRO/M PCs.

	COMPAQ DESKPRO/M FAMILY	ALR BUSINESS VEISA	AST PREMIUM II	DELL POWERLINE DE	IBM PS/2 MODEL 90
1. Five-board modular design	Yes	No	No	No	No
2. Upgradable video without using an expansion slot	Yes	Yes	No	No	No
3. Separate I/O board for potential enhancements and ease of service	Yes	No	No	No	No
4. 14 levels of security including cable-lock provision	Yes	No	No	No	No
5. System configuration and ID number available in memory and accessible remotely	Yes	No	No	No	Yes
6. Power supply adequate for all expansion needs	240w	150w	145w	220w	194w

Keeping track of what's inside each PC is easy with our built-in Asset Management provision. Each COMPAQ DESKPRO/M PC can tell you its serial number, how it's configured and what it has installed. Even remotely, over the network. A big time- and money-saver for MIS managers.

Smart for tomorrow—built to adapt to changing technology and changing needs. With Intelligent Modularity, upgrading and expanding only takes about five minutes. And, thanks to unique Compaq engineering, you get optimum performance no matter how you configure your system.



Intelligent Modularity—Five separate subsystems let you upgrade or replace only what you need.

The 32-bit EISA expansion bus gets the most out of high-performance processors, expansion boards and peripherals. Superior thermals keep things cool, no matter how many options you add. And the 240-watt power supply can take anything you plug in.

Call your Authorized COMPAQ Computer Dealer and ask to see the wonders of the COMPAQ DESKPRO/M personal computers firsthand. Call 1-800-231-0900, Operator 185. In Canada, call 1-800-263-5868, Operator 185.

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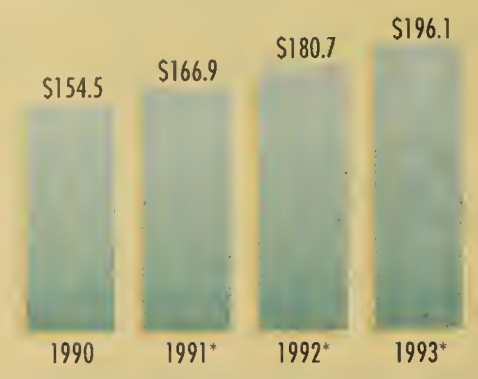
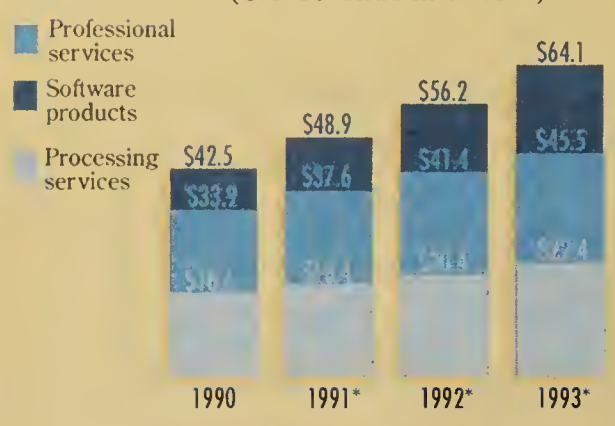
INDUSTRY OUTLOOK

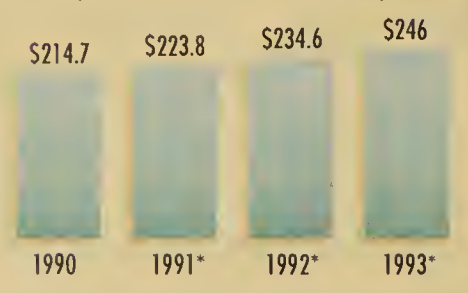
Computers and related equipment
(Worldwide revenue of U.S. companies in billions)



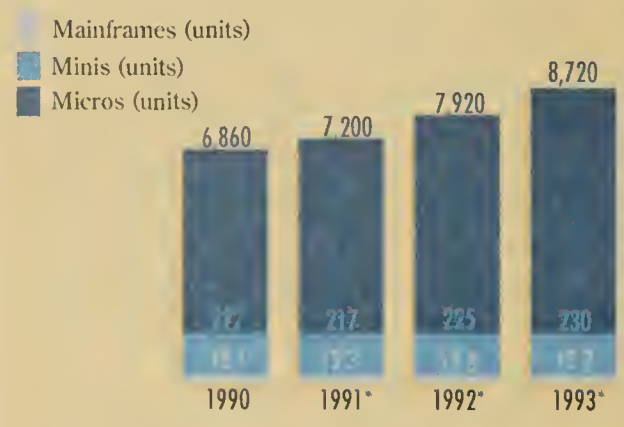
Software and services
(U.S. revenue in billions)



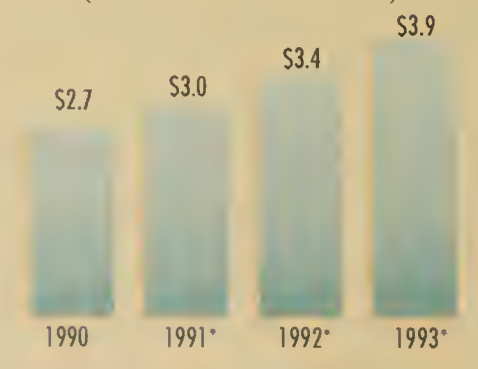
Telecommunications
(U.S. revenue in billions)



Micro, mini, mainframe computers
(U.S. unit shipments in thousands)



PC software
(U.S. revenue in billions)



*Projected

Source: Top four charts: CBEMA, Industry Marketing Statistics, with forecasts by BDA Associates. Bottom chart: Dataquest, Inc

CW Chart: Janell Genovese

No picnic on Capitol Hill

Computer industry will face battles over tax laws, export regulation

BY GARY H. ANTHES

There's plenty of fuel for debate on Capitol Hill this election year for users and vendors of information technology. That's the easy prediction.

The tougher call is whether the computer industry will be able to advance its multifaceted Washington agenda, especially on matters such as tax laws, export rules and intellectual property protections.

In 1992, "there may be so much political posturing that there will be political gridlock," says Kenneth Kay, executive director of the Computer Systems Policy Project (CSPP), a coalition of chief executives from 12 large U.S. computer companies.

Such pessimistic forecasts won't stop Kay and the rest of the industry from trying. He says a top goal for CSPP will be to get a tax break for companies doing high-tech research and experimentation. While a tax credit is currently available, it is simply an extension of a temporary measure implemented in 1981. High-technology firms say long-term research is being inhibited by the nonpermanent measure.

Rep. Dan Rostenkowski (D-Ill.), chairman of the House Ways and Means Committee, says he will try to end the perennial suspense surrounding the credit, making the credit permanent or scrapping it for good.

More tax regulation

On another front, software vendors will mount an all-out assault to defeat an administration-backed tax bill that would impose a 14-year amortization period on purchased intangible assets, including software. Practically speaking, that would mean that buyers who are used to writing off software in five years or less would be forced to defer tax deductions, effectively raising the cost of the software. The bill would also require companies to account for software long after it has been put to pasture.

An administration official says he favors exempting mass-market software from the bill. But it's an even bet as to whether custom-developed software or software obtained as part of a corporate acquisition will escape the mandatory write-off.

Anthony Russo

Beyond the Beltway, states scrambling for new sources of revenue are targeting the multibillion-dollar computer services industry, most of which has traditionally been off-limits to the sales tax collector.

Pennsylvania levied a 6% sales tax last year on computer services, a measure the industry is still trying to roll back.

Nevertheless, the Information Technology Association of America (ITAA), formerly Adapso, says legislatures in Florida, New York and Maryland are likely to take up service-tax legislation early in the year. California, Kansas, Nebraska and Nevada are preparing to consider measures in the spring. In Maryland and Florida, bills have already been filed that would nullify sales tax exemptions for computer services.

Export woes

In the global market, considerable progress was made in 1991 in easing restrictions on computer hardware exports. But two contentious issues are likely to keep computer industry lobbyists busy in 1992.

For one, an export regulation requires exporters to gain government approval before distributing software with encryption capabilities. Vendors will push Congress to reauthorize the lapsed Export Administration Act, the House version of which would free all mass-market software from export controls.

The second concern stems from a U.S. Department of Defense proposal. It would require exporters of powerful reduced instruction set computing workstations to build in various safeguards against proscribed use by unfriendly countries.

Here again, the industry's agenda calls for enactment of the House version of the Export Administration Act reauthorization, which would bar such unilateral controls. "The president is holding most of the cards on these issues," says David Peyton, senior director of government relations at ITAA. "He can simply continue to put out executive orders under emergency powers."

Other icy action

Other items on the industry's 1992 agenda include the following:

- **Software piracy.** The industry will press the U.S. Trade Representative to slap sanctions on countries — especially China, India and Thailand — that fail to protect intellectual property rights.
- **Immigration law.** With foreign labor in the U.S. an increasingly important source of scarce skills, the industry will fight to change new interim labor regulations that make it more difficult to hire foreign nationals.
- **Patent law and procedures.** Even supporters of patenting software say the government needs to improve procedures for determining patentability. The industry will attempt to influence a government report due out this summer.
- **Government/industry collaboration.** The industry will propose a model for greater collaboration with national laboratories whose nuclear weapons mission is fading.
- **Regional Bell operating companies' (RBOC) entry into the information services.** More court tests are likely, but activity will move from the courts and the Federal Communications Commission (FCC) to Congress, which may impede the RBOCs by insisting on "safeguards" against anticompetitive behavior.
- **Computer security.** Legislation is likely to modernize the 1984 Computer Fraud and Abuse Act to address mischief such as viruses.
- **Wireless networks.** The FCC and the industry will work to define radio-based personal communications services for data and voice.

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65. Communications Systems/Public Utilities/ Transportetion
70. Mining/Construction/Petroleum/Refining/Agric.
80. Manufecturer of Computers, Computer-Related Systems or Perlpherels
85. System Integrators, VARs, Computer Service Bureeus, Software Planning & Consulting Services
90. Computer/Peripheral Dealer/Distr./Retailer
75. User: Other _____
95. Vendor: Other _____
(Please specify)

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22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; LAN Mgr., PC Mgr.
23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Mgrs., Suprv. of Programming, Software Dev.
32. Programmers, Software Developers
60. Sys. Integrators/VARs/Consulting Mgt.

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13. Treasurer, Controller, Financial Officer
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65. Communications Systems/Public Utilities/ Trensportetion
70. Mining/Construction/Petroleum/Refining/Agric.
80. Menufecturer of Computers, Computer-Releted Systems or Peripherels
85. System Integrators, VARs, Computer Service Bureeus, Software Plenning & Consulting Services
90. Computer/Peripherel Deeler/Distr./Reteiler
75. User: Other _____
95. Vendor: Other _____
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23. Dir./Mgr. Sys. Development, Sys. Architecture
31. Mgrs., Suprv. of Programming, Software Dev.
32. Progremmers, Softwere Developers
60. Sys. Integretors/VARs/Consulting Mgt.

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12. Vice President, Asst. VP
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Bright lights, hot companies: News in industry not *all* bad

BY ALAN J. RYAN

When John Morgridge became the 34th employee and chief executive officer at Cisco Systems, Inc. three years ago, the U.S. economy was already showing signs of troubled times ahead. But today, while many of the nation's largest computer vendors are choking in the current slump, the employee roster at Menlo Park, Calif.-based Cisco has climbed to 600, making the networking vendor one of the nation's fastest growing companies.

Cisco, and dozens of other smaller companies like it, is proving that just because IBM, Digital Equipment Corp. and other biggies are staggering, it doesn't mean the entire computer industry has the blahs.

In fact, *Fortune* magazine's recent "Fortune Fast 100," a listing of the nation's fastest growing companies, includes more than 40 computer-related companies, including the Top 4 spots. Similarly, *Inc.* magazine's year-end list of the 500 fastest growing companies in the U.S. for 1991 counts no fewer than 135 computer-related businesses.

Some of these little dynamos — whose revenues are typically in the $5 million to $50 million range — boast stratospheric growth rates of 200% or more. While it's not uncommon for small companies to grow quickly, notes Martyn Roetter, director of the information technologies practice at Arthur D. Little, Inc. in Cambridge, Mass., doing so in a hard-hit industry such as computers is a lot tougher and thus more dramatic.

Many going public

In recent months, many smaller firms braved the recession and went public (usually a good sign). They include Wellfleet Communications, Inc. in Bedford, Mass., maker of multiprotocol bridge/routers; Symix Systems, Inc. in Columbus, Ohio, which sells financial and manufacturing applications; and VAX software maker Ross Systems, Inc. in Redwood City, Calif.

In truth, the 30,000 or so industry dwarfs account for only about 12% of revenue in the $544 billion computer industry, according to Broadview Associates, a Fort Lee, N.J. -based information technology mergers and acquisitions firm. Still, they are widely viewed as a hopeful sign of future rejuvenation.

Nimble new players such as Cisco, Wellfleet Communications and mail-order personal computer vendor Zeos International Ltd. in St. Paul, Minn., which was ranked No. 1 on the *Fortune* list, are good examples of small newcomers that have spiced up the industry by outmaneuvering bigger, slower-moving rivals in hot markets.

In fact, Roetter says, newcomers have a pretty good record teaching older competitors about how to stay agile and focus on a hot niche market.

Shining stars

A complete list of the most stellar fast risers would be too long to print here. Among the hottest up-and-comers are the following:

• **Cisco**, which makes and installs multiprotocol routers and terminal servers, has enjoyed a stellar 228% annual growth rate for the past few years. Sales, $183 million in fiscal 1991, are expected to hit $250 million this year. That's despite tough competition from Wellfleet Communications, Westboro, Mass.-based Proteon, Inc. and Advanced Computer Communications, Inc. in Santa Barbara, Calif., and new products from DEC and IBM.

• **Thinking Machines Corp.** in Cambridge, Mass., introduced in November what was billed as the fastest computer ever. Despite advances from Intel Corp., Thinking Machines claims about one-third of the massively parallel systems business in the U.S. Company revenue has risen about 50% annually for the last few years; 1991 figures are expected to climb to $90 million, up from $65 million the previous year.

• **Compression Labs, Inc.** in San Jose, Calif., and Peabody, Mass.-based Picturetel Corp. are also rising fast. These two entrepreneurial firms are defining the rapidly advancing field of videoconferencing — and cornering the market.

According to analysts, Compression Labs will enjoy a 40% rise in revenue for 1991, to about $70 million. Picturetel is expected to make about $75 million, which is nearly double the previous year's sales.

• **Go Corp.** in Foster City, Calif., is the developer of the Penpoint operating system for handwriting recognition. Several bigger vendors interested in this potentially huge marketplace are expected to adopt Go's technology.

Growing pains

Despite such impressive gains, life is not all heady for these fast risers. As profits grow, so does bureaucracy. And rapid growth usually means constant change, which is never easy, Morgridge says.

"We are kind of like a teenager that all of a sudden finds himself at 6 ft, 2 in. and couldn't really control himself when he was 5 ft," he recalls. Informal meetings, common when the company had 25 employees, for example, became impossible when the team reached 600 members.

Many new companies also have a tough time establishing distribution channels, according to Harvey Popell, a Broadview analyst. And developing channels can be expensive, which is one reason why many small companies are allying with bigger, established players.

Stagnating growth

Another harsh reality is that few businesses can sustain 200% or higher growth for too long. Eventually, markets begin to level off, and growth slows — or even dives.

Osborne Computer Corp., which introduced the first "transportable" computer back in the early 1980s, is a classic example of a company that "ran into a brick wall and fell apart," Roetter says.

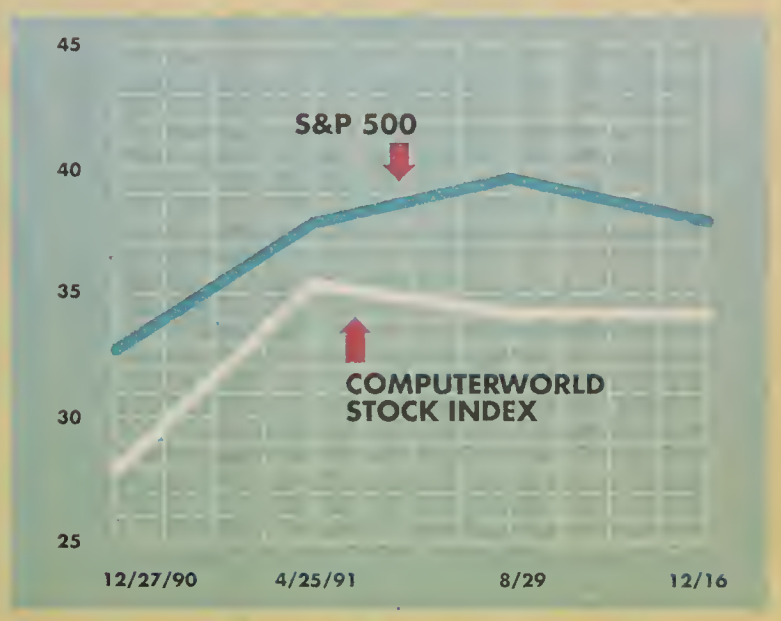
The number of small computer companies that have filed for Chapter 11 bankruptcy protection recently bear testimony to this fact.

According to Popell, in the short term, smaller companies will endure the possibility of slowed growth and will help keep the computer industry healthy.

"The industry is ever-changing," he says. "Every time we think we've seen the last Compaq or Microsoft or other superstar, companies rise from zero dollars to multimillions in a short period of time, and others come along."

STOCKS

YEAR-END STOCK TRADING INDEX



TOP PERCENT GAINERS	
Picturetel Corp.	244.33
Data General Corp.	241.78
Cambex Corp.	230.94
Novell, Inc.	230.30
Advanced Micro Dev.	223.08

TOP PERCENT LOSERS	
Western Digital Corp.	-58.97
Data Switch Corp.	-54.84
Compaq Computer Corp.	-52.76
Printronix, Inc.	-50.00
Computer Horizons	-43.75

TOP DOLLAR GAINERS	
Microsoft Corp.	244.33
Borland Int'l, Inc.	241.78
Novell, Inc.	230.94
Xerox Corp.	230.30
Picturetel Corp.	223.08

TOP DOLLAR LOSERS	
Compaq Computer Corp.	-29.75
IBM	-25.00
Autodesk, Inc.	-16.50
Texas Instruments, Inc.	-10.00
Conner Peripherals, Inc.	-8.75

Communications and Network Services	Up 45.22%
Computer Systems	Up 17.09%
Software & DP Services	Up 43.49%
Semiconductors	Up 28.40%
Peripherals & Subsystems	Up 22.80%
Leasing Companies	Up 17.95%

Source: Norby International, Inc.

Major initial public offerings in order of first trade dates:

Zilog, Inc., Campbell, Calif. (microprocessors)

Ross Systems, Inc., Redwood City, Calif. (software for VAXs)

Input/Output, Inc., Stafford, Texas (data acquisition systems and peripherals for oil and gas exploration)

Picturetel Corp., Peabody, Mass. (videoconferencing equipment)

Platinum Technology, Inc., Lombard, Ill. (DB2-related software and training)

Quarterdeck Office Systems, Inc., Santa Monica, Calif. (memory management utilities)

Micronics Computers, Inc., Fremont, Calif. (system boards for IBM Personal Computers)

Sybase, Inc., Emeryville, Calif. (relational database management systems)

Wellfleet Communications, Inc., Bedford, Mass. (multiprotocol bridge/routers)

Chipcom Corp., Southboro, Mass. (intelligent wiring hubs)

Bachman Information Systems, Inc., Cambridge, Mass. (computer-aided software engineering and re-engineering tools)

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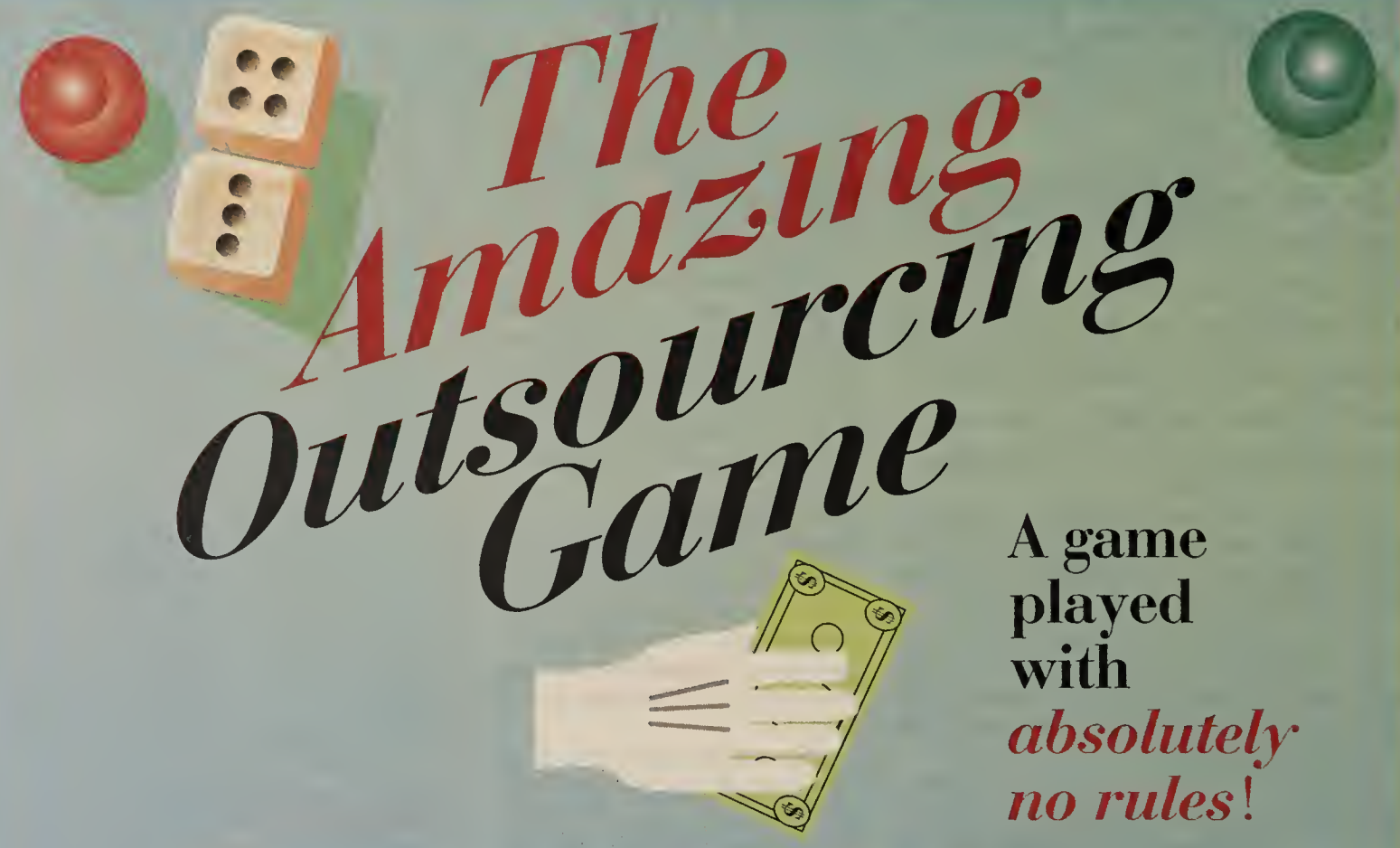
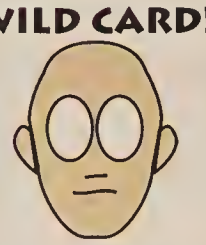


IBM Systems Solutions Corp. (ISSC)	BONUS!	BAD NEW$	DEAL!	DEAL!	BAD NEW$	DEAL!	Computer Sciences Corp.
	Born in June '91, now has revenue stream near $300 million and contract backlog near $2.2 billion. Surge ahead.	Industry association Adapso (now ITAA) launches investigation into antitrust implications. Go back.	First blg contract nabbed only a few weeks after independence as Zaie Corp. signs 10-year, multimillion-dollar pact. Advance.	Continental Bank Corp. signs 10-year pact for estimated $700 million. Advance.	Troubled Southeast Banking Corp. temporarily shelves plans to outsource IS to ISSC. Forfeit two turns.	Circle the board and collect an estimated $3 billion as United Technologies Corp. Inks 10-year deal that hints of future add-ons.	DEAL! Shoot forward and salute as banner year for federal contracts begins with $181 million, five-year MISTS deal. Other deals follow.
TIME OUT Focus on "multisourcing" – i.e., outsourcing discrete IS functions instead of whole data center. Advance into possible boom market.	GOOD NEW$ Advance further into health care market as Voluntary Hospitals of America signs on for multiyear facilities management.	GAIN GROUND! Advance further into European market with complex $89 million, five-year pact with British Petroleum.					BAD NEW$ First-half profits constrained by red ink from Belgium-based CIG Intersys, acquired two years ago. Step back.
TIME OUT First anniversary of landmark $220 million, 10-year Sun Refining & Marketing Co. deal. BONUS POINT for retaining Sun's IS staff.	GOOD NEW$ Collect more than $100 million in 1991 revenue – twice 1990's.						BUY, BUY Advance ahead on shopping spree: acquire Intellicom, Compusource, Butler Cox.
NEW FACE Paul Cosgrave becomes managing partner of Integration Services and Technology, bringing technology clout. Move forward.							BAD NEW$ Lose $1.5 billion Army Reserves contract to Boeing. Retreat a few spaces. Award currently under protest.
							DEAL! Circle board twice, collect $3 billion as General Dynamics Corp. outsources all IS, including applications development.
							TIME OUT Sit out one turn to ponder how to absorb General Dynamics operation, including 2,600 staffers, three huge data centers.
Andersen Consulting	BONUS! Win three bonus points as award-winning education broadcast Jason is beamed to students just two weeks after its electronic equipment is lost at sea.	TIME OUT Pause to count more than 30 major deals signed and renewed this year, plus more than one dozen big alliances and acquisitions.	GOOD NEW$ Collect $145 million as third-quarter profits climb 13% on sales of $1.7 billion. BONUS: Revenue from parent General Motors Corp. dips below 50%.	DEAL! Make hostile takeover bid for UK-based systems integrator SD-Scicon. Advance further into fertile European outsourcing market.	GAIN GROUND! Acquire McDonnell Douglas Systems Integration Co. and flagship CAD product, Unigraphics. Advance further into manufacturing services.	DEAL! Nab $2.1 billion deal with Continental Airlines Holding, Inc. Roll again for another turn. Quantum leap forward.	Electronic Data Systems Corp.

WILD CARD!



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WILD CARD!

SHL Systemhouse

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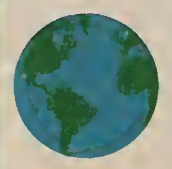
WILD CARD!

IBM

New Blue

Wild card in spades; no one knows exactly what the new IBM will be — except coming on strong.

WILD CARD!



We are the world

It's getting easier to tally which firms *aren't* offering outsourcing services these days.

HOW TO PLAY

COMPUTER INDUSTRY VERSION

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Object of the game. Players try to help companies by taking over the management of customer's information technology operations, up to and including running the whole IS function.

Who can play. Anyone.

How to score. Declare yourself an outsourcer and get a deal. Short-term winners are determined by highest contract value at the end of each year. Long-term winners are judged on the basis of profitability and longevity.

Prizes. Share of some $22 billion market estimated to grow to roughly $57 billion by 1996, according to Meta Group, Inc., a market research firm based in Westport, Conn.

Disqualifications. Companies that are out of business and/or have not yet been created are barred from play. A self-proclaimed outsourcing vendor that has never actually had a customer may be disqualified.

Tips on strategy:

- A good basic tactic is to win a large government contract, then branch into the commercial market.
- Consider expanding geographically or into a specific vertical market.
- Sudden changes in buzzwords or strategic direction can be an effective tactic.

BOTTOM LINE

▶ **Heavy networking action.** Expect a flood of products for operating systems and LAN management. Also due: a host of high-speed LAN links from the public and private side. Pages 38-39.

▶ **Application development goes downscale.** More work will switch to client/server and PC-based systems using object-oriented technologies. Page 42-43.

▶ **Good news for hardware buyers:** Price cuts are predicted for platforms of all sizes. Portable buyers can expect Intel 386SX-based notebooks for less than $1,500 by year's end. PC prices will level off, but look for reductions on I486-based products. Workstation vendors will offer more choices under $10,000. And mainframe shoppers will continue to enjoy discounts of 30% to 50%. On the midrange, makers will pitch multiuser Unix-based systems as corporate servers. Pages 40-41.

▶ **Imaging's set to skyrocket.** Despite the stalled economy, many companies are pushing ahead with electronic document imaging pilots. IDC predicts sales will double, to $1.9 billion, in 1992. Page 46.

▶ **Multimedia will get more real.** Advances in optical discs, wider acceptance of international data compression standards and the Apple/IBM alliance should advance popularity. Market Intelligence Research Corp. estimates 1992 sales will reach $1.3 billion. Page 47.

Bridge by bridge by bridge

As standards groups grind along, IS looks for real products to build open systems

Open systems. The words conjure up vistas of thousands and thousands of diverse computers interconnecting across continental — or even global — networks.

Information systems managers, however, have become too savvy to be seduced by such utopian visions. Instead of waiting for various standards from on high, smart buyers are also looking at individual products to provide interoperability.

"I've detected a major shift in the meaning of open systems," says Berl Hartman, director of product marketing at Sybase, Inc. "Open systems used to be synonymous with Unix. Now, it's coming to mean interoperability between systems."

Indeed, others share the belief that open systems in 1992 will be propelled less by industrywide standardization than with bridges between individual products.

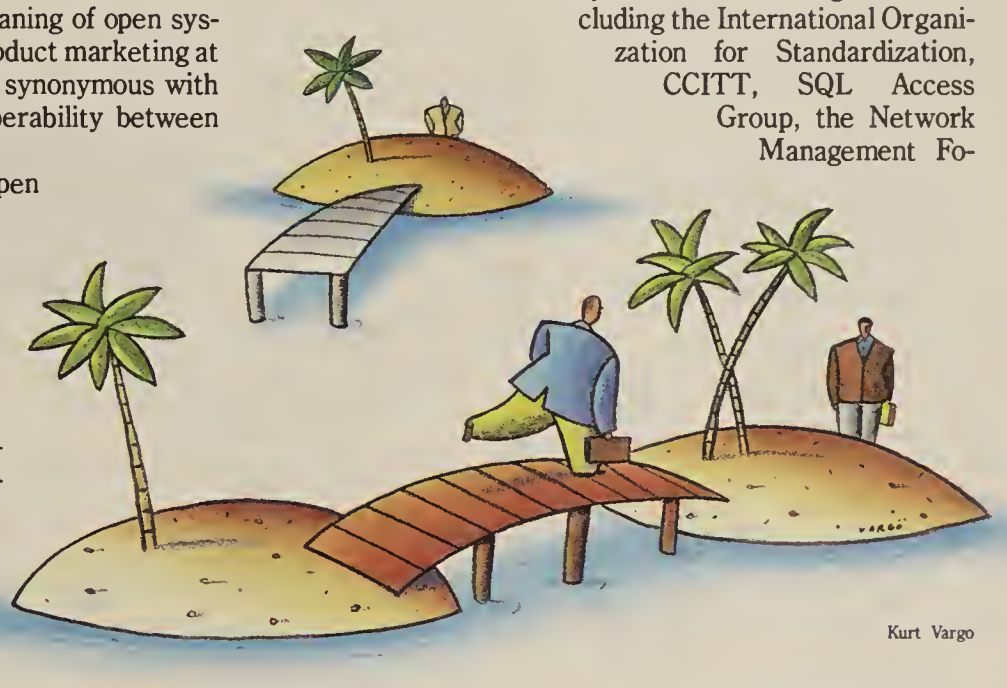
From networks to databases, operating systems, user interfaces and applications development, vendors are scrambling to add open systems features in hopes of knocking down troublesome barriers between proprietary communications, software and hardware.

At the same time, analysts say, companies will quicken the pace of joint-development deals and strike new partnerships. "Vendors really can't afford to go it alone anymore," says Rikki Kirzner, a senior software analyst at Dataquest, Inc. in San Jose, Calif. "The software is getting more complex, and development cycles are getting longer and longer. The result is that it's going to take a lot of money to get those products out there."

In network management, electronic mail and high-speed networking, for example, various de facto vendor groups are cooperating to come up with quicker and dirty versions of interoperability products, rather than wait for standards bodies to come out with the "official" versions.

As open systems materialize, an exact definition is still up for debate. Kirzner suggests that qualifying systems must have multiple sources, widespread third-party support, a large base of trained users and developers and standards — official or de facto.

However, the rush of bottom-up activity doesn't mean that major standards-setting bodies, including the International Organization for Standardization, CCITT, SQL Access Group, the Network Management Forum and others, have become irrelevant.



Kurt Vargo

If anything, decentralization, downsizing to personal computers and client/server architecture have also quickened the acceptance of standards like Transmission Control Protocol/Internet Protocol and X.400 for networking.

Even the most closed systems are being adapted for wide-reaching networks that let users send and receive electronic

Continued on page 36

Client/server moving beyond 'hopeware'

BY MICHAEL FITZGERALD

Yes, Virginia, client/server architecture is real. And it might even grow up a little in 1992.

Any advance would be positive in the minds of some users, who for the last two years have seen the "Year of Client/Server Computing" come and go with little in the way of needed products.

"The [client/server] software world has made zero improvement in the last year, in my opinion," says Michael Purcell, manager of technology planning at Baxter Health Care Corp. in McGaw Park, Ill. What Purcell says he would like to see is "functionality along the lines of what you have in mainframes and minis, in terms of system management, diagnostics and monitoring."

Despite such disappointment, Baxter and many others will pursue client/server projects in the coming year. Analysts, such as Frank Dzubeck, president of Communications Network Architects, Inc., a consulting firm in Washington, D.C., caution firms to start slowly. He recommends "upsizing" applications from a personal computer local-area network environment to a work group or departmental level, then using these as test cases. That's very similar to the strategy Baxter will be following.

"The pieces are not in place, so we'll look at what we can really live without," Purcell explains. "We'll be doing research and prototypes."

Observers generally agree with Purcell that for client/server to really catch on, better management and development tools are needed. Until the client/server development environment begins to stabilize and more products emerge, the technology will be a spectator sport for most information systems shops.

"Your average user is just studying and watching," says Frank Michnoff, program director at Meta Group, Inc. in Westport, Conn. Michnoff says "bleeding-edge" users are implementing the technology, while leading-edge types are probably running pilot projects. "It won't be mainstream for another two to three years," he predicts.

At Bank of Boston, for instance, a team of IS workers is pushing toward a first-quarter 1993 delivery date for a

Continued on page 36

Open systems become real bridge by bridge by bridge

CONTINUED FROM PAGE 35

mail, query corporate databases or share applications software, for example. As a result, more U.S. companies will adopt formal standards in 1992.

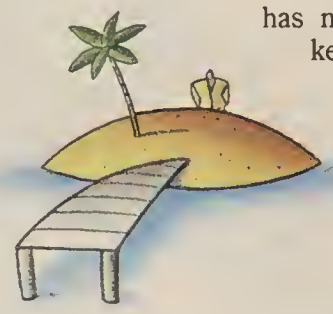
Product links and formal guidelines will keep open systems advancing in 1992. Following is an overview of major "open systems" products due.

Operating systems

Some excitement will continue in the operating systems arena, but the "kernel wars" that characterized the 1980s are finished. "Most of the fighting is over, and now the fun begins," says Judith Hurwitz, president of Hurwitz Consulting Group in Newton, Mass.

The fun, among other things, means users will have to continue porting applications between different Unix variants, new OSF/1 products and newly opened proprietary operating systems such as VMS. All will use basically the same standards, notably Posix and XPG from X/Open Consortium Ltd.

Another sign of the cease-fire will be growing cooperation by the two major Unix standards competitors, the Open Software Foundation (OSF) and Unix System Laboratories, Inc. (USL). The groups "will have a very close relationship, possibly including joint marketing and development agreements," predicts Julie Rodwin, program director at Computer Intelligence/Infocorp's Unix systems service in Acton, Mass.



Kurt Vargo

Still, the biggest force in "open" operating systems for 1992 will continue to be USL's Unix System V Release 4. The only major Unix variant now shipping, Unix V Release 4 dominates the market. But don't count out OSF/1, which Digital Equipment Corp. and Hewlett-Packard Co. will ship early in the year. IBM will begin shipments of its high-end OSF version in the second quarter.

Products that will deliver on promises to open proprietary operating systems via Posix will also appear in 1992, including DEC's VMS and HP's MPE.

Nowhere is the term "open systems" taken more in vain than in local networking. Despite widespread lip service, vendors are likely to continue bucking the trend to openness in 1992.

Network vendors "don't want to share technology," says analyst Frank Michnoff at Meta Group, Inc., in Westport, Conn. "They want to go out and own the corporate environment." Few cooperative projects between vendors are imminent.

One exception: Novell, Inc. and IBM. Both companies, giants in their own worlds, have expressed willingness to make Novell's popular Netware and IBM's LAN Server work together.

There are other small signs of progress. Microsoft Corp., Banyan Systems, Inc. and Novell are building links by adopting common server protocols. (Ironically, the trio is incorporating *proprietary* Apple Computer, Inc. standards). Despite such cooperation, each vendor has made clear its intentions to keep their its products proprietary — for now.

GUIs

Graphical user interfaces (GUI) are playing an important role as the pretty face masking the ugly world of interoperability. But some big blemishes remain.

Differences between the major GUIs — the OSF's Motif for Unix, Microsoft's Windows for DOS, Microsoft's Presentation Manager for OS/2, and Apple's Macintosh interface — are significant enough to drive developers crazy, especially in enterprise plans that want to deliver the same application using different platforms and GUIs.

Fortunately, new tools are on the way that will let developers build an application once, then recompile it for different environments. New products are due in 1992 from Open, Inc. (Aspect GUI) and Guideware Corp. in Mountain View, Calif. (Wintran), joining veterans Easel Corp. (Easel) and JYACC, Inc. in New York (JAM).

Also in 1992, USL will ship its Motif/Openlook/Intrinsics Toolkit, which lets users choose a Motif or Openlook screen. Each of these products should give interoperability a cleaner face.

Analysts say openness will also get a boost in 1992 from a new generation of tools that will let developers more easily create software to run on different vendors' computers. "We are really at a market turn, as a whole new generation of tools start to come out," says Peter Kastner, vice president at Aberdeen Group in Boston.

> OPENNESS WILL GET a boost in 1992 from a new generation of tools that will let developers more easily create software to run on different vendors' computers.

Put simply, these packages use numerous database management systems and permit developers to write an application on one machine, then port it to another. Analysts say the products are ideal for developers building applications for distributed, client/server environments.

No single tool can do everything, Kastner and others note, so several vendors plan to tackle the problem during 1992 by offering "infrastructures" — software schemes designed to help users work in complex environments by providing an organized way of connecting and integrating tools from different vendors. HP and IBM will promote HP's Softbench, DEC will push its own standard, as will the CAD Framework Initiative in Santa Clara, Calif.

Other open products are expected from a wide range of both traditional computer-aided software engineering vendors and from suppliers of PC, mainframe and expert systems software.

Databases

There will be no rest for the weary; relational database vendors that worked hard at interoperability in 1991 have a new set of challenges in '92.

Most of 1991 was spent developing gateways or interfaces between various database systems — all in the name of client/server architecture and open systems. Database firms are expected to loose a new flood of gateways over the next 12 months, along with distributed database software.

Oracle Corp., in Redwood City, Calif., the largest independent relational DBMS vendor, expects to ship its Version 7.0 database engine, albeit months late. Eventually, Oracle says, the package will run on all 80 platforms the company supports, including dozens during 1992. Oracle also will try to improve its connections to IBM's DB2 via the new SQL*Net 2.0 communications software and protocol translator.

Also active is the Ingres Products division of Ask Computer Systems, Inc. The Alameda, Calif.-based company plans to ship Ingres 6.4 early in '92 and will begin widespread porting in the first quarter. Sybase, too, plans a "major announcement" aimed at uniting disparate applications. According to Hartman, the firm will also continue to introduce open products aimed at older legacy systems.

On the consortium front, the SQL Access Group will continue work on a single SQL standard. Simultaneously, wider acceptance is expected for the International Standard Organization's Open Systems Interconnect remote-procedure call standard, which is supposed to help applications run against multiple databases.

X/Open's XPG 4 standard, which tries to make workstations and other hardware more compatible with various types of Unix applications, will also appear in 1992.

Informix Software, Inc. in Menlo Park, Calif., has staked its fortunes on the open marketplace and will remain active in 1992.

Informix Chief Executive Officer Phil White says: "Open systems are going to come from vendors cooperating, not by vendors doing a lot of finger-pointing."

Reported and written by Jean Bozman, Johanna Ambrosio and Jim Nash.

Client/server moving beyond 'hopeware'

CONTINUED FROM PAGE 35

new client/server system.

"We are in the evaluation process and hope to have an application up and running for testing in the next six months or so. But we're pretty much committed to that direction [for a corporate architecture], unless something goes really wrong," says Hilal al-Hilali, senior section manager at Bank of Boston's technology integration center.

Al-Hilali says he expects high-level prototyping tools to start appearing next year, as well as enhanced versions of development tools such as Microsoft Corp.'s Visual Basic.

Big impact seen

The impact client/server will have by the end of the decade will be monumental, most observers say. "This evolution is as important to the computer industry as the evolution from batch processing to timesharing," says Peter Schay, client/server program director at Gartner Group, Inc. "It is a fundamental re-architecting in applications — who's using them and how they're supported."

Before that happens, however, users must port "a huge legacy" of mainframe and minicomputer applications into more open environments, Dzubeck says.

Dzubeck says he expects these applications to be moved slowly to a new class of high-powered, multiprocessing PCs, workstations and minicomputers.

In fact, observers say that evolving high-end PCs and operating systems to support them may be the biggest advance for client/server over the next 12 months.

Right now, many traditional PC vendors offer multiprocessing systems, including Compaq Computer Corp., Tricord Systems, Inc., AT&T's NCR division and Wyse Technology, Inc. Next year, they will start to sell boxes with up to eight processors.

However, this class of products is not quite ready for prime time. "You can [build client/server applications on multiprocessors], but they're not robust enough to be distributed very well," Dzubeck says, citing monitoring and security issues.

Compaq's Systempro is perhaps the best known multiprocessor, but very few of the shops that have it use more than one processor. What's missing are multiprocessing operating systems such as Novell, Inc.'s Netware SFT, which is expected to debut in 1992.

"We are greatly anticipating the release of SFT Level 3, which does take advantage of multiprocessing, though not symmetrical multiprocessing," says Louis Kahn, network administrator at the division of immunization at the Centers for Disease Control in Atlanta. The centers use a number of Systempros, and Kahn says he expects to gain greater redundancy from being able to take advantage of a second processor, which will save him time and money.

Still, most observers agree with Baxter's Purcell, another Systempro user who says multiprocessing boxes "seem like overkill."

That's true for now, but by 1994-95, "the market is going to ramp up," Dzubeck says, "just like it did for PCs."

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NETWORKS

MANAGEMENT

Kitchen-sink approach out — for now

BY ELISABETH HORWITT

The network supermanager — that expensive, unwieldy, kitchen-sink system — is losing its high-priority status on many 1992 budgets.

Not that companies don't need a reliable multivendor network management system for their corporate networks. It's just that many organizations have gotten tired of waiting for the ultimate "manager of managers" to arrive.

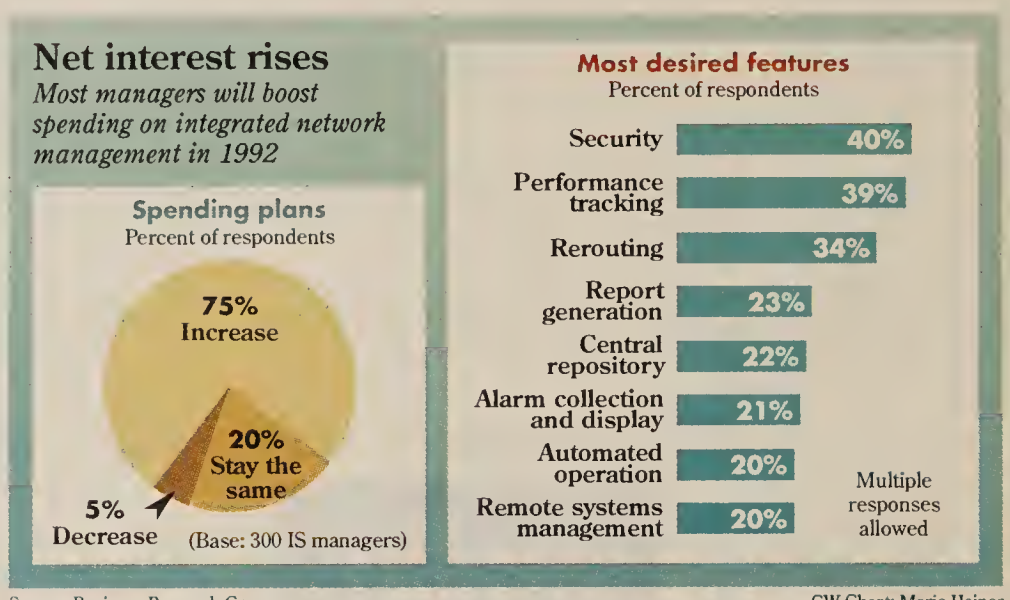
As a result, many firms are looking at simpler, less far-ranging alternatives.

The mammoth systems — notably, Digital Equipment Corp.'s Enterprise Management Architecture, IBM's Netview, Hewlett-Packard Co.'s Openview and AT&T's Accumaster Integrator — appeared several years ago. They were billed as a way for users to manage their entire corporate networks.

But for all their ambition, analysts say, these products have taken a long time to make good on their promise. Users complain that the platforms only collect alerts and alarms, that they do not support a wide mix of products and that they lack applications to effectively analyze and manage network activity.

In some cases, cost is also an issue. Prices for integrated network management systems range from $20,000 to $250,000 — and that's just for software, according to Todd Dagres, director of data communications research at The Yankee Group in Boston. The lower price gets you a basic system; the upper gets you an entire suite.

As a result, many buyers say they expect to delay purchases of manager-of-managers in 1992. Not that companies have given up on integrated network management; spending is still up in this area (see chart, above).



Source: Business Research Group

CW Chart: Marie Haines

However, rather than try to install kitchen-sink managers, companies will focus on integrating management of key network pieces such as local-area networks and routers.

McDonald's Corp. is one such company. It is putting an 18-month search for a supermanager on hold, says Mike Disabato, manager of the network management design group. Instead, the firm will concentrate on installing corporatewide LANs, wide-area connections and an integrated system to manage the installation, Disabato says.

McDonald's plans to implement LANs across the corporation in the next couple of years and wants the management system in place before the LANs get too widespread, Disabato explains.

In the meantime, vendors are not sitting on their hands waiting for customers to buy their supermanagers. Many are planning big product introductions to meet the longer term needs of companies such as McDonald's. Areas to be targeted next year include the following:

• **Support for the Simple Network Management Protocol (SNMP).** HP and DEC both plan to support additional networking devices on their existing SNMP-based platforms. Also on the way is increased management functionality for these platforms. For instance, IBM has promised to formally introduce early next year an SNMP-based workstation being co-developed with HP.

• **Scalable platforms.** IBM, HP and DEC have introduced SNMP-based systems on scalable Unix-based platforms. Several bridge and router vendors have implemented SNMP-based management systems on Openview or Sun Microsystems, Inc.'s Sunnet Manager.

• **Killer applications.** Alliances between vendors of supermanagers, element managers and applications should help produce needed packages including help desk administration, trouble ticketing and configuration management products. Ideally, these would run across different types of LANs. Applications vendors with planned introductions include Peregrine Systems, Inc., Isicad, Inc. and Remedy Corp.

• **Integrated systems, applications and network management.** More firms are demanding this capability, which lets a user accessing a host on a remote LAN determine if slow response is due to a downed line, an overloaded LAN or a too-busy server CPU.

IBM, HP and DEC have all promised introductions in 1992. This bodes well for corporations waiting for more viable kitchen-sink management.

Companies such as DHL Worldwide Express, however, will still abstain from the supermanager strategy. "We are a hugely political environment, and certain areas want to do their own management," network analyst John Payne explains. "One central management station for the world is politically impractical, technically impossible."

Railway carrier CSX Corp. also has strong reservations about finding a manager of managers — particularly for its LANs, according to Assistant Vice President Doug Underhill. "Trying to find one big blob that does everything means all kinds of compromises in performance, recoverability or reconfiguration," Underhill says.

OPERATING SYSTEMS

Security, support alliances, interoperability top concerns

BY JIM NASH

The pell-mell pace of change in local-area networking is unlikely to slow down or become more orderly in 1992. Despite the recent rush of alliances in this arena, competition has abated only slightly.

In the coming year, Novell, Inc. is expected to boost its already huge market share from 67% to 72%, according to Forrester Research, Inc. The survey, which polled 126 users on buying plans, forecast that Banyan Systems, Inc. will shrink from 7% to 2% of the market.

• **Interoperability inches ahead.** Novell says Netware Version 3.2, set for year-end release, will mean users no longer need to buy special versions for different operating systems. Netware 3.2 will initially run on servers next to AIX and OS/2, industry insiders say. What users are wondering is when Novell will become fully interoperable with Microsoft Corp.'s LAN Manager or Banyan's Vines.

Last year, Banyan announced compatibility for Apple Computer, Inc. Macintosh users, while Microsoft and Novell announced interoperability with Macintosh servers. This year, watch this trio for Unix compatibility.

• **More support alliances.** The idea of forging agreements that hold a single company responsible for investigating and fixing customer complaints in a multiproduct environment got a huge boost in '91, with team-ups between some of the industry's biggest names. Synoptics Communications, Inc. announced its Customer Support Affiliate Program, for example, while Novell touted its Technical Support Alliance. In 1992, existing alliances will find new members, and new agreements will emerge.

• **Technology alliances bear fruit.** Optimists expect to see products emerge from alliances formed in 1991. IBM and Novell, for example, are expected to move from simply repackaging Netware in an IBM box to jointly producing a new product. By year's end, look for Netware for 32-bit OS/2 and the RISC System/6000.

• **Security issues loom.** With groupware applications on the rise, security continues to be a big buyer concern, both at the file and networkwide levels. Apple's new Open Collaboration Environment will attempt to address some of those concerns. The product will use a sophisticated electronic signature feature to ensure the authenticity of documents routed around networks.

In the meantime, Novell is concentrating on two other aspects of security: improved data tracking and fault tolerance. Analysts say Novell needs better directory services to track information on entire networks rather than individual or small groups of file servers.

Additionally, Novell will put System Fault Tolerance Level III through beta tests early in 1992. This software duplicates the entire contents of a server in real time on a twin personal computer. If all goes well, the application could be introduced by late 1992.

• **Object-oriented interest.** Advocates say object-oriented software could redefine networking as dramatically as Microsoft's Windows made desktop computing more user-friendly. The more zealous say network administration could become as easy as switching icons when network equipment is changed. IBM already has interests in Metaphor Computer Systems, Inc. and Patriot Systems, Inc., two companies working on the technology. Novell is said to be seeking companies developing network management and database software around object orientation.

INTERCONNECTION

A good year for linking LANs

BY JOANIE M. WEXLER

User zeal to exchange ever-larger electronic files with remote colleagues will spiral in 1992, causing a boom in high-speed internetworking technologies.

Analysts say high interest by buyers will spark the introduction of new heavy-duty equipment — particularly multiprotocol routers — and accompanying high-speed wide-area technologies and services (see story below).

Many companies plan to trade up bridges for more efficient, secure routed connections on their growing local-area network internetworks.

"We're in the process of router shopping," says Robin Layland, engineering consultant at The Travelers Corp. in Hartford, Conn. The insurer now runs 200 bridged LANs connecting 5,000 devices.

Bridging schemes for such a large network have become unwieldy, Layland explains, in part because of the seven-LAN limit of source-route bridging, required to bridge Token Rings.

Greater interest in routers will mean that prices for bridges will start to drop to commodity levels in 1992, according to Marty Palka, senior networking analyst at Dataquest, Inc., a consultancy in San Jose, Calif.

New, improved offerings

To handle the exploding volume of inter-LAN traffic, several vendors will upgrade their multiprotocol routers or enter the market for the first time.

Wellfleet Communications, Inc. in Bedford, Mass., plans to ship its industrial-strength Backbone Node bridge/router in March. Priced between $94,000 and $290,000, the device will feature a 1G-bit backplane that can reportedly forward 500,000 data packet/sec. between networks.

Archrival Cisco Systems, Inc. in Menlo Park, Calif., says it plans to release its own high-capacity, multiprotocol bridge/router during the year, though no announcement has been made.

New multiprotocol router players will include industry heavyweights Digital Equipment Corp. and IBM. DEC's initial router is due to ship in January, though some users are upset about DEC's initial lack of support for LAN protocols.

Also in January, IBM is expected to announce shipping dates for its RISC System/6000-based router to an impatient industry. In August, IBM said its homegrown product will support Systems Network Architecture and Netbios communications protocols along with Transmission Control Protocol/Internet Protocol and possibly some LAN protocols.

Also, look for more routers that support Banyan Systems, Inc. Vines LAN communications protocols. Proteon, Inc. says it will offer Vines support on its router in the first quarter, while Wellfleet promises the same by midyear.

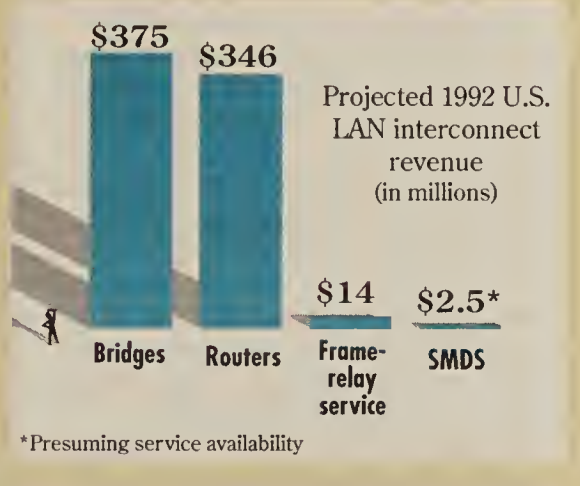
This capability is important to organizations such as Pennsylvania Blue Shield, now eyeing Cisco, the only vendor supporting Vines, to replace bridges in its large Banyan network, according to communications programmer Linda DuRussell.

The year will also see a further meshing of internetworking devices and intelligent wiring hubs. For example, Hughes LAN Systems, Inc. plans first-quarter shipments of a hub with a 2G-bit fast-packet backplane to support heavy internetworking traffic.

Developments in wide-area network technology will aim to ease internetwork bottlenecks and will parallel router developments. Frame relay, Switched Multimegabit Data Service and Integrated Services Digital Network are slated to sweep the country starting midyear.

Interconnect income

Router revenue will nearly catch up to those of less expensive bridges in 1992



Source: CIMI Corp. CW Chart: Janell Genovese

BACKBONES

High-speed links to flood bandwidth-hungry firms

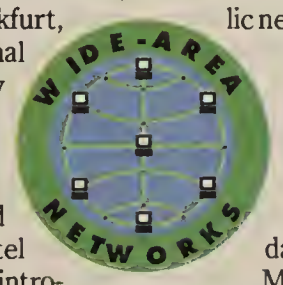
BY JOANIE M. WEXLER

Avalanche! Wide-area networking technologies of many types will tumble forth this year, as public telecommunications carriers and private equipment vendors deliver on 1991 announcements.

Suppliers are targeting companies that need to link high-speed local-area networks across geographic boundaries, those implementing bandwidth-hungry applications such as imaging and those investing in videoconferencing as corporate travel budgets shrink.

By midyear, frame relay — a fast form of packet switching — will be widely available in both private and public networks. Private equipment vendors are expected to deliver on frame-relay interfaces announced in 1991. On the public side, services will kick in at AT&T and MCI Communications Corp. midyear, about six months after U.S. Sprint Communications Co.'s December '91 rollout.

In addition, BT North America, Inc. has said it will add links to Amsterdam, the Netherlands and Frankfurt, Germany, to its international frame-relay service in early 1992. BT already announced London and Paris links in December '91. BT North America and value-added network competitors Wiltel and Compuserve, Inc. all introduced domestic frame-relay services in the fall of 1991.



Long promised Integrated Services Digital Network (ISDN) and Switched Multimegabit Data Services (SMDS) are also expected to appear on public networks nationwide by year's end. ISDN and SMDS are switched services aimed at applications in which it is not practical for users to define in advance who they want to communicate with.

Largely because of these new public services, 1992 could see a shift of corporate data traffic back to public networks. One reason is that equipment vendors will support only frame-relay technology, while public carriers plan to offer ISDN and SMDS as well.

Another reason for the migration is the credibility the public carriers have earned for their economic transport and management of voice over virtual private networks (VPN). VPNs mimic a private backbone, allowing users to run voice over a dedicated chunk of the public network.

While most private WAN users don't plan to move entirely to public networks, many do intend to complement their existing setups with public services to accommodate new or unlinked sites.

Most frame-relay, ISDN and SMDS offerings will not exceed 1.5M bit/sec. in 1992. Thus, they could face competition in campus-type environments from 100M bit/sec. Fiber Distributed Data Interface backbones and metropolitan-area network services.

With so many WAN choices emerging, many companies will likely spend much of the year just getting corporate telecommunications strategies in place, once new-service tariff information is available.

TECH BRIEFS

Look, no wires

■ Wireless computing will become a pretty standard option for portable users by the end of '92, observers say. The success of AT&T's Safari notebook and Hewlett-Packard Co.'s 95LX are expected to drive the technology, as will continued commitment by IBM, Motorola, Inc., AT&T's NCR division and others. Observers say wireless standards will also evolve in 1992.

'The check is in the E-mail'

■ Electronic mail isn't just for messaging anymore. More than ever this year, "companies will start to use E-mail as part of production systems," says David Ferris, president of Ferris Networks, a research firm in Concord, Calif. For example, users will increasingly purchase E-mail to process, verify and track customer orders and sales information.

This shift will make it more important to merge E-mail with existing applications, he says. So standardizing on an application programming interface (API) will probably become a very hot issue. So far, vendors including Lotus Development Corp., Microsoft Corp. and Novell, Inc. all offer nonstandard APIs.

An equally big headache will arise in the form of managing multivendor E-mail systems; namely, making sure a message that needs to cross different E-mail systems actually arrives at its destination. Soft-Switch, Inc. is in the forefront with a very sophisticated — and expensive — management system.

Vendors will also continue to enhance their directories, which should help users integrate different systems, Ferris says.

X.500 directory services should begin to appear from public E-mail carriers, promising automatic routing of user messages between different vendors. However, Ferris says it will take several years before major implementations of private X.500 systems hit the market.

PLATFORMS

PORTABLES

Smaller, cheaper units coming

BY MICHAEL FITZGERALD
and JAMES DALY

The future has never looked so small, as portable computer vendors labor to deliver on the big promises they made in '91 — namely, to squeeze more into less space.

Notebooks, which displaced laptops as the hot technology last year, will continue to set size standards in 1992. But the great shrinking computer saga will continue as "subnotebooks" — computers sized between notebooks and palmtops — appear on the market.

Dell Computer Corp., for example, is readying a $1,500 subnotebook that will weigh less than 4 pounds. Apple Computer, Inc. is expected to release a smaller version of its Powerbook portable weighing less than 5 pounds. Pen-based systems of subnotebook size will also appear.

Whether they choose to compete in the subnotebook category or not, portable and pen-based manufacturers will be striving to reduce weights and prices this year, while increasing battery life and adding features.

• **Lighten up.** Besides shrinking cases, vendors will look for other ways to shed pounds. Toshiba America Information Systems, Inc., for example, says it uses carbon-reinforced plastics to reduce casing weight without compromising durability.

• **Lower prices.** Buyers can look forward to better deals on Intel Corp. 80386SX-based notebooks, which should reach near-commodity status. By year's end, expect to see an SX notebook with 2M bytes of random-access memory, a 60M-byte hard drive, an IBM Video Graphics Array-compatible screen and a 2-hour battery for under $1,500. Price cuts will be driven by ferocious competition with Far Eastern clone makers, as well as by steady drops in component pricing.

Get ready

During the next 12 months, portable buyers can expect the following:

- **Subnotebooks:** Dell, Apple
- **Color screens:** Dell, AST Research, Epson America, Sharp Electronics
- **Power Supplies:** Nickel hydride batteries from Epson, power management chips from Intel, Advanced Micro Devices

• **Longer battery life.** Improved cell technology, aided by power-management software and hardware, will help vendors stretch the time between recharges of both notebook and pen-based computers. Battery life now stands between two and three hours.

Power management chips, such as Intel's 80386SL family and Advanced Micro Devices, Inc.'s AM386SXL, will be near universal by the end of 1992. Intel officials claim new versions of the company's SL microprocessor will boost battery life to as long as 11 hours; systems using these chips will be available before year's end. Many vendors have also developed software utilities, such as autoresume and sleep mode, to conserve battery power.

Vendors say these advances in management and conservation can extend battery life without adding the premium cost of new battery technologies.

Nickel hydride batteries have begun to replace traditional (and environmentally hazardous) nickel-cadmium (nicad) cells. Epson America, Inc. says nickel hydride will be interchangeable with its nicad batteries but will cost about twice as much (roughly $100 to $129).

Research on lithium batteries remains hot, but these are still considered unstable because they explode under certain conditions and are thus unlikely to reach the market for some time.

• **Favorite color.** Color screens will be another big feature for some vendors. Previously found only on heavier, AC-powered systems, active-matrix and passive-matrix color screens will appear in 1992 on battery-powered systems.

Prices won't be cheap, though: Passive-matrix boxes from Dell and AST Research, Inc. will sell for close to $5,000, while prices for active-matrix machines from Epson and Sharp Electronics Corp. will be lucky to slip below $8,000.

• **Pushing the power envelope.** Some vendors are pushing low-power versions of Intel's I486SX processor. Others are offering full-power I486DX chips. Moreover, 2½-in. hard drives that can hold as much as 180M bytes of data will also appear.

Pens: Don't write home yet

Will 1992 be the year that decides if the pen is mightier than the keyboard?

Probably not, analysts say. Although Lempesis Research, a market research firm in Pleasanton, Calif., expects 477,000 pen-based units to ship in 1992, most of that hardware is still under development. Pen-based software isn't much closer to market. The two operating systems that analysts say will dominate — Go Corp.'s Penpoint and Microsoft Corp.'s Windows for Pen Computing — have yet to ship.

Despite the infant status of the industry, a few firms and products have stood out:

• Momenta Corp. in Mountain View, Calif., which combines handwriting recognition with a keyboard.

• PI Systems Corp. in Portland, Ore., whose Infolio product is expected to weigh less than three pounds, cost less than $2,000 and squeeze up to 15 hours out of six AA batteries.

• Samsung Information Systems America, Inc., whose Penmaster offers a superior display, according to analysts.

• Two models from Sony Corp. and one each from Sharp Corp. and Kyocera Corp. currently available in Japan but expected to ship domestically this year.

JAMES DALY

WORKSTATIONS

Commercial desktops eyed

BY MARYFRAN JOHNSON

Like race car drivers finally noticing the passing scenery, workstation vendors are zipping into 1992 alert to the growing acceptance of Unix on commercial desktops.

Growing demand for reduced instruction set computing (RISC) Unix products will boost workstation sales over the next year, predicts Laura Conigliaro, an analyst at Prudential Securities, Inc. in New York.

Buyers will have more choices than ever in the below-$10,000 price category — now dominated by Sun Microsystems, Inc. — as companies such as Digital Equipment Corp., IBM and Hewlett-Packard Co. unveil their "personal workstations" as bridge machines to lure PC users into workstations.

DEC recently introduced a pair of diskless Personal Decstations at PC-style prices ($3,995 and $4,995), and IBM is expected to unveil its own Personal RISC System/6000 workstations in January 1992. HP will also barge into the low end before mid-February with its "Bushmaster" 9000 workstation, priced under $10,000.

"We are arriving at the cutting edge between PCs and workstations," says Robert Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco. "Workstations are capturing market share for two reasons: their full multitasking support with good performance and their integrated networking."

There is one caveat: available software. "The RISC world wants to take over the desktop, but the question is still applications availability," says Jack Karp, an analyst at Meta Group, Inc. in Westport, Conn.

High-end Unix-based servers will become key offerings for vendors such as Sun, HP, DEC and IBM.

Increasingly, analysts say, high-powered workstations and servers are encroaching on territory once reserved for large systems. HP officials say they've snatched at least 50 new accounts off mainframes and proprietary minicomputers in recent months with their top-end HP 9000 servers. And IBM's RS/6000 line — expected to earn $2 billion in revenue in 1992 — is scoring more than half its sales in commercial accounts.

Sun revenue comes up

Sun's Galaxy 600MP server began shipping in volume just a few weeks ago and is already boosting the vendor's quarterly revenue. In several months, Sun will announce workstations and servers with the superscalar Scalable Processor Architecture chip, based on Texas Instruments, Inc.'s Viking chip. Also expected midyear is Sun's Solaris 2.0 operating system, equipped with symmetric multiprocessing capabilities.

Another interesting scenario will unfold at Novell, Inc., which is moving toward the RISC market at a brisker pace. In December, Novell announced that Netware will run native on HP's RISC chip. Similar introductions will likely follow for native Netware on DEC, IBM and Sun platforms, Karp says.

Unix should cause less consternation for users in 1992, analysts say, despite more than 200 variants on the market. Those variants will begin looking more alike as the two major Unix camps — Unix Systems Laboratories, Inc. and the Open Software Foundation — work together behind the scenes, adopting bits and pieces of each other's work (see story page 35).

OSF/1 will finally begin volume shipping in 1992, and The Santa Cruz Operation will also roll out Open Desktop for the Advanced Computing Environment (ACE). Now that USL has joined the ACE initiative, analysts believe it may act as a unifying influence there.

The year will also see the debut of Microsoft Corp.'s Windows New Technology operating system, a high-end, advanced implementation of Windows for servers and advanced workstations on both RISC and Intel platforms.

MIDRANGE

Alive and quite liable to kick

BY MARYFRAN JOHNSON

The coming year should prove that the much-maligned midrange is not dead, but just going through a midlife crisis.

True enough, vendors such as Digital Equipment Corp. will continue to thrash through the painful transition from proprietary to open systems, while others, such as Prime Computer, Inc., may fade from view altogether.

Overall, however, the forecast calls for a steady stream of applications moving off mainframes. These will be distributed to increasingly powerful, less-expensive midrange systems and servers. Hewlett-Packard Co., for example, has tallied 50 new accounts in recent months by offloading IBM mainframe applications to high-end HP minicomputers.

Distributed client/server systems will continue to gain credibility in the corporate world, with a sharper focus on the server end of the equation.

"Only in the midrange do you have the rich functionality and the cost effectiveness" needed for an enterprise server," says Wes Melling, an analyst at Gartner Group, Inc.

Gartner Group expects DEC's upcoming Alpha/RISC systems, when linked together in clusters, to satisfy the requirements of 90% of commercial processing by 1993. That could mean midrange systems capable of *replacing* powerhouse mainframes such as IBM's Enterprise System/9000 line.

Multiuser Unix-based systems promise to be the hottest '92 revenue sizzlers. Already, these products have spurred hefty growth rates of 50% or more annually for HP and the HP 9000 Model 800s, while upping the competitive stakes for Pyramid Technologies, Inc.'s Corporate MIS server line.

"There is clearly a move to open systems under way in the midrange," says Robert Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco. "There is also an increasing trend to multiprocessing with standard processors. Two advantages there: The components are cheaper at the chip level, and the systems are easier to upgrade."

The growing ability to add gigabytes of memory to "relatively low-cost platforms" will lead to new hardware economics that encourage businesses to distribute their databases, according to Herwick.

Other midrange trends analysts anticipate in '92 include the following:

• **Decreasing concern about standardizing** on a single operating system, as "middleware" software evolves. Loosely defined, middleware is layered software that provides services above the operating system and below the applications in a multivendor distributed network, such as DEC's Network Application Support products or the Open Software Foundation's (OSF) Motif graphical user interface.

• **Service and support** will be big bargaining chips with customers downsizing crucial applications. "Getting the big buys — not selling one or two systems — will be the key thrust for all the suppliers," says Tom Willmott, an analyst at Aberdeen Group in Boston.

• **The circle of serious players** will extend beyond the traditional firms — HP, DEC, IBM, NCR Corp. — to include specialists such as Stratus Computer, Inc., Sequoia Systems, Inc., Sequent Computer Systems, Inc. and Pyramid Technology. While vendors are after different markets, transaction processing is a popular target.

• **Standards will become** more of a checklist item than an overriding concern for midrange buyers. The here-and-now focus will be on applications and how to distribute them. Still, big standard-setting events will continue to be important, such as IBM, DEC and HP's agreement to follow OSF's Distributed Computing Environment model. Another checkpoint: compliance with Posix for application portability in multivendor networks, which IBM, DEC and HP have sworn to do now.

Systematic shift

Platforms of all sizes are expected to continue migrating to Unix during the next 5 years

	Worldwide hardware sales 1990	Worldwide hardware sales 1995*	Percent of hardware 1990	Percent of hardware 1995*
Unix	$15.42M	$40.37M	11%	20%
DOS and OS/2	$53.06M	$75.33M	36%	38%
370	$27.56M	$33.50M	19%	17%
VMS	$6.35M	$7.60M	4%	4%
AS/400 and S/3X	$6.60M	$8.00M	5%	4%
Macintosh	$4.80M	$8.00M	3%	4%
Other	$31.93M	$24.79M	22%	13%
Total	**$145.72 M**	**$197.59M**		

*Projected

Source: International Data Corp. CW Chart: Michael Siggins

MAINFRAMES

Low growth, discounts continue

BY ROSEMARY HAMILTON

The poor economy and industry trends, such as downsizing and outsourcing, will continue to peck away at an already sluggish mainframe market.

Not surprisingly, analysts predict continued low growth for mainframes in 1992. "With recessionary pressures and people still continuing to explore client/server-style alternatives, growth will be well within single digits," says Will Cappelli, a vice president at New Science Associates, Inc. in Southport, Conn.

The only thing that won't be sluggish is the competition level among IBM and its two chief rivals, Hitachi Data Systems Corp. (HDS) and Amdahl Corp. Discounting has been on the rise since the late 1980s, and analysts expect this practice to continue.

Price breaks in the 30% to 50% range won't be uncommon next year, says Frank Gens, an analyst at Technology Investment Strategies Corp. in Framingham, Mass.

At least the year will begin on an upbeat note, with moderate mainframe sales in the first half as IBM, Amdahl and Hitachi fill 1991 backlogs and introduce newer generation systems.

All three vendors are expected to ship systems announced in 1990 and 1991. Amdahl and HDS are expected to deliver their top-of-the-line models. Amdahl's eight-way processor should clock in at more than 300 million instructions per second, while HDS should be shipping its five- and six-way models.

IBM will be filling out its so-called Summit line, or newer generation Enterprise System/9000s, by shipping several lower end, water-cooled models in the March time frame.

By the later part of 1992, the companies will introduce better pricing and new functions to spark demand, says Susan Gannon, another analyst at Technology Investment Strategies. Gannon says she expects no technology breakthroughs but only extensions to announced technologies, such as IBM's fiber-optic channel architecture, Escon, and Sysplex, its strategy for coupling mainframe engines.

The two plug-compatible manufacturers will likely announce additional support for these mainframe features.

Gannon says she expects announcements to focus on functional improvements, such as larger amounts of memory at lower prices and a possible improvement to expanded storage access, by allowing a direct path to it instead of going through main storage first. IBM could also announce a kicker to the ES/9000 line as a way to showcase these technology improvements as well as better price/performance, Gannon adds.

As IBM ships its new-generation ES/9000s, it could signal a quick death for the older, so-called "hybrid" ES/9000s. IBM says it is committed to these systems, also known as J Primes, but users will likely see little value in them because the newer models offer the same class of processing capacity but have much improved engines.

TECH BRIEFS

Supercomputers hot

■ The waning months of 1991 saw a flurry of supercomputer announcements. In the new year, hopes center on application development tools. Analysts say a more standard approach to supercomputing would help speed application development. Because most supercomputers are based on proprietary CPUs, some companies, such as Cray Research, Inc., will be reevaluating their architectures in light of open systems and massive parallelism.

PC price cuts slowing

■ Competition will remain vicious, but personal computer price drops won't be anything like those of the last year. Just the same, by this time next year, advances in chip technology will take users to a new level of computing for the same price as today's high-level machines. Machines based on the Intel Corp. I486 chip will drop in price to make room for Intel's P5 follow-on to the 486 chip. And for the same cost of an 80286-based machine today, you'll be able to get PCs based on the 80386DX chip.

Speaking of chips . . .

■ Intel Corp.'s P5, due in midyear, is expected to offer the first peek at 64-bit computing, have addressable cache and compete with reduced instruction set computing chips. Don't be surprised if it comes in a variety of sizes, just like its I486 forebear.

ACE's last stand

■ 1992 will probably make or break the Advanced Computer Environment (ACE), a jumbled alliance led by Digital Equipment Corp., Microsoft Corp. and Compaq Computer Corp. The group is struggling to establish a third desktop alternative to Sun Microsystems, Inc. and whatever rolls out of IBM/Apple Computer, Inc. Some analysts say ACE is a hopeless tangle of mismatched partners bickering over different agendas. Yet others are just as certain it will provide a broad array of shrink-wrapped Unix software to run on both Intel and RISC platforms. A critical component of ACE will be Windows New Technology, Microsoft's new high-end implementation for servers and high-end workstations.

APPLICATION DEVELOPMENT

LARGE SYSTEMS

IS finds client/server is way to go

BY ROSEMARY HAMILTON

With more people developing applications on smaller platforms, information systems managers can look forward to a whole new set of issues and technologies in 1992 — those surrounding client/server development.

Many companies are replacing large-scale design with enterprise development strategies that involve smaller systems or platforms with both a desktop and a host component. For most, it's a new world.

"Managers don't know how far to go with security and backup issues," says Shaku Atre, president of Atre/Intec, Inc. in Rye, N.Y. "Some people aren't sure how to [move] programmers into client/server. Some don't have a [high level] of LAN expertise," she says.

As development shifts to smaller platforms, software companies are ramping up product efforts. Initial rollouts of computer-aided-software engineering (CASE) for local-area network-based design appeared last year. Other CASE vendors will move onto the client/server bandwagon in 1992.

"In 1992, client/server will get even more attention, and your mainline CASE vendors will be delivering it," says Ed Acly, an analyst at Technology Investment Strategies Corp. in Framingham, Mass.

Aaron Werman, president of the consulting firm Database Definitions, Inc. in New York, says he already sees users building "an enormous amount of intelligent workstation-type applications in this mold."

"We will start seeing tools that allow [users] to specify applications by intelligently putting pieces of it where it makes the most sense," Werman continues. He says he foresees a big fight between Knowledgeware, Inc., Texas Instruments, Inc. and Software AG of North America, Inc.

For its part, large-scale development will continue to be confined largely to maintenance and overhauls. Last year's flurry of re-engineering and maintenance marketing campaigns, such as IBM's expansion of AD/Cycle to address maintenance, testify to this trend.

Little of substance is expected in 1992 from IBM, which has dominated the applications development market since introducing its AD/Cycle strategy in 1989 but has hedged as much as it has delivered.

Analysts are expecting another wait-and-see year as many users maintain lukewarm commitments to IBM's repository-based strategy. "IBM still needs to deliver a real repository, and I don't believe we'll see that" in 1992, Acly says. "So in the meantime, it will continue to put out brushfires."

Still, Werman says he expects IBM to eventually succeed with its repository.

SMALL SYSTEMS

OOP to get serious in '92

BY CHRISTOPHER LINDQUIST

Instead of just hearing a lot about object-oriented programming (OOP) technology, there's a good chance that people will finally start using it — and seriously.

Of course, object-oriented tools have received great attention from commercial software developers for several years. Ditto for their cousin, visual programming tools, which provide an icon-based method of programming. Both are intended to minimize coding by letting users "draw" an application on the screen. Thus, even nonprogrammers can take part in the design and development process, advocates say.

So what will change the minds of information systems managers who have traditionally been skeptical of the purported benefits, such as decreased development times through code reuse and reduced software maintenance backlogs? Lower prices, for starters.

Some tool kits have dropped to the under-$100 price range and include incentives such as free runtime licenses. 1992 "is going to be the year that MIS buys object-oriented languages," predicts Adrian Bowles, director of advanced software development research services at New Science Associates, Inc., a consulting firm in Southport, Conn.

Products to watch include Borland International, Inc.'s Objectvision, Parc Place Systems, Inc.'s Smalltalk and The Whitewater Group's Actor, as well as visual programming tools such as Microsoft Corp.'s Visual Basic. Other tools — such as VZ Corp.'s VZ Programmer — let users "paint" applications and attach them to actual code instead of simply using them as prototypes. Analysts say these tools should improve over the next year.

Another factor pushing the popularity of these new tools are "hybrid" languages, such as Borland's C++ and the future C++ product, Microsoft C Version 7, reportedly due from Microsoft next year. Microsoft is also said to be working on an object-oriented version of Cobol, which could be released in 1992.

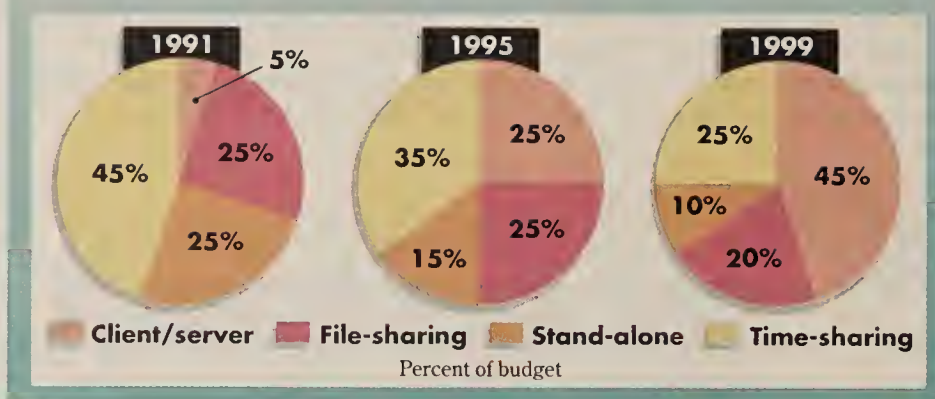
These languages will help provide a migration path for IS from current code to object-oriented code. But because the payoffs of OOP will not be instantaneous, buyers need to make a serious commitment to it if they want to see any benefits, Bowles cautions.

"The advantage is certainly not on your first project," he says. "The advantage is in adopting it as part of your development strategy."

On the far frontier, some companies are already exploring the possibilities of applications development through such techniques as virtual reality. In effect, this approach eliminates the "programming as language" metaphor, replacing it with "programming as action," says Natasha Crol, program director for application development strategies at Meta Group, Inc.

Where development dollars go

During the next decade, major corporations will increasingly focus on creating client/server applications



Source: Forrester Research, Inc.

CW Chart: Marie Haines

PC DBMS

Windows, client/server versions ahead

BY CHRISTOPHER LINDQUIST

Move over, stand-alone DOS-based database management systems. Client/server and Microsoft Corp. Windows-based databases will finally start to arrive for personal computers in 1992.

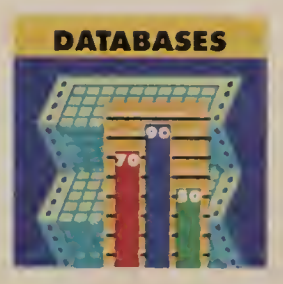
"The edict has been mandated that IS organizations must build client/server applications," says Jeff Tash, president of Database Decisions, a Newton, Mass.-based consultancy. "That's going to drive that part of the market."

The shift to client/server systems is slower than anyone expected — largely because the transition is difficult, both for vendors and users.

"The industry found that the transition toward client/server presented new problems that no one expected," says Richard Finkelstein, president of Performance Computing, Inc., a database consulting firm in Chicago.

Handling the load

However, that complexity is being handled by current client/server database combinations, such as the Microsoft/Sybase, Inc. SQL Server, Oracle Corp.'s Oracle products running under IBM's OS/2 and future tools from Borland International, Inc., which acquired Interbase Software Corp.'s Unix- and VMS-based server product.



Windows-based products will show signs of life as well. Both Borland and Fox Software, Inc. are expected to release Windows versions of their popular products aimed at besting current Windows favorite, Software Publishing Corp.'s Superbase. Entries from Apple Computer, Inc. Macintosh database makers such as Claris Corp. could further heat things up.

While newer technologies are garnering the most attention, older DBMSs could hardly be considered dead. The new powerhouse created by Borland's purchase of Ashton-Tate Corp. is expected to dominate the still-viable market for character-based DOS products.

Dbase and Paradox hold a combined market share estimated at more than 70%, and Tash calls the power of the new firm "awesome."

STORAGE

TAPE, DISK, OPTICAL

New media could RAID storage market in '92

BY J. A. SAVAGE

Data storage technology is usually about as interesting as a chest of drawers. But 1992 should see some real action — and the emergence of some big technology winners and losers. Redundant arrays of inexpensive disks (RAID) are rising, digital audio tape (DAT) is dying, and tape storage may benefit from new media.

• **RAID on high.** Iceberg, the long-expected RAID system from Storage Technology Corp. in Louisville, Colo., will finally ship this year. Billed as the industry's first RAID system for mainframes, Iceberg will give IBM and plug-compatible makers some serious price/performance competition for mainframe storage.

A RAID device can store as much data as direct-access storage devices, with equivalent access times, but they cost much less because they use off-the-shelf disks. Software controls data integrity and speed.

RAID devices have been introduced mostly by smaller vendors, although Compaq Computer Corp., Hewlett-Packard Co. and a few others have already moved in. Larger vendors will continue to announce RAID products, says Jim Porter, president of Disk/Trend, Inc., a market research firm in Mountain View, Calif.

• **Done in by rock 'n' roll.** While Sony Corp. and other owners of DAT technology dithered over trying to protect the medium from home copying of records and compact discs, other tape technologies, such as 8mm cassettes, got a head start.

As a result, the coming year will see vendors of 8mm, ¼-in. tape and DAT trying to one-up one another with a flurry of products at lower prices, says Bob Abraham, an analyst at Freeman Associates, Inc. in Santa Barbara, Calif.

The cost of DAT cannot drop as low as the competition because production volumes never hit predicted peaks, according to Peripheral Strategies, Inc., a market research firm also in Santa Barbara.

• **New media for tape.** Quarter-inch tape will adopt magnetic material — specifically, barium ferrite — which will permit higher density, according to Abraham. Four and 8mm tapes will not change media, he adds, although consumers will begin to see them in a thinner, film-like form that permits higher density recording.

• **Smaller and denser drives.** Expect to see 1G-byte, 3½-in. disks made possible by fine-tuning recording density, Porter says. Also, expect to see 2½-in. disks, now used in laptop computers, drop in price and become competitive with 3½-in. disks.

Porter calls 5¼-in. disks "dinosaurs" — except for high-end drives that are in the 1.7G- to 3G-byte range.

• **Multifunction jukeboxes.** A host of optical jukeboxes with rewritable and write-once — or multifunction — drives will appear this year. "Multifunction jukeboxes have not only the write option but also newer robotics and better media," Abraham says. A complete conversion of write-once jukeboxes to multifunction will eventually take place, he adds.

PC SOFTWARE

BUNDLED OFFICE PACKAGES

How suite it was — and is again

BY DEREK SLATER

They're billed as "Everything you'll need for the office PC," and buyers will be hearing a lot more about them in 1992. Sound like deja vu?

They're hardly a new idea (remember Symphony and Framework?). But so-called "software suites" — packages that combine word processing, database, electronic mail, communications, spreadsheets and other functions — are getting a big new push from PC software vendors.

The vendors are hoping to convince users anew that today's software suites make economic and user-friendly sense. The promise is that you can easily move from application to application, transfer information among applications and use one interface for all.

Industry heavyweights are busily developing, updating and especially acquiring applications (see chart).

Opinions differ, however, on the worth and impact of software suites. Rich Bader, contributing editor to Belmont, Calif.-based industry newsletter "PC Letter," says a mixed-vendor set of Windows applications should provide the hooks for transferring data between applications just as well as a single-vendor collection.

Others wonder if vendors can manage the integration of different applications while still maintaining their individual strengths.

At the same time, some users may value integration above all else. "They may not offer the best of breed in every category, but the integration is pretty smooth," says Ronnie Marshak, editor of the "Office Computing Report" in Boston. Marshak points out another advantage: one-stop service and support.

Something to watch: Industry leaders will continue acquiring competitors. "Technologically, the small companies can compete," Bader says. "Marketing is another matter."

Fill in the blanks

More acquisitions likely as vendors move to applications suites

	Spreadsheet	Word processing	DBMS	Graphics	E-mail	Groupware/ Scheduling
Borland	Quattro Pro		Dbase,* Paradox*			Sidekick
Lotus	1-2-3, Improv	Ami Pro*		Freelance	CC:Mail*	Notes
Microsoft	Excel	Word	Cirrus	Powerpoint	Microsoft Mail for Networks*	
Computer Associates	CA-Compete* Supercalc	CA-Textor	Dbfast*	CA-Cricket Presents*	CA-Email*	CA-Uptodate
Symantec		Just Write	Q&A			Time Line
Possible targets	Wingz/Informix Software	Describe/ Describe, Inc. Legacy/NBI	Sybase/ Sybase, Inc. Foxpro/ Fox Software	Charisma, Micrografx Draw/ Micrografx, Inc. Corel Draw/ Corel Systems	Da Vinci Email/ Da Vinci Systems Beyondmail/ Beyond Software	Right Hand Man/ Futuresoft Engineering Higgins/Enable Software

*Products obtained via company acquisitions

CW Chart: Marie Haines

Windows' position intact

This year catapulted Microsoft Corp.'s Windows from OS/2 competitor to undisputed new hotshot in the PC operating system world.

It's not likely to lose that status in 1992. Stewart Alsop, editor of "PC Letter," predicts that Windows will be dominant for the next three to five years, either in its current form or in its New Technology (NT) iteration.

The most IBM can hope for with its expected new release of OS/2 in March is to buy about six months of time while Microsoft plays catch-up. But first it has to deliver all the promised functionality, including built-in network support.

Windows' NT is supposed to offer the same functionality in a package intended more for high-performance servers.

And don't forget about DOS. A robust new release has sparked significant sales, proving that plenty of companies aren't planning to open a new Window any time soon.

CAROL HILDEBRAND

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EMERGING TECHNOLOGY

TECH BRIEFS

Groupware gains

■ Lower prices, bigger sales of existing products and public exposure of successful installations will help groupware slowly gain market confidence in 1992. More developers — which are said to include Borland International, Inc. and Microsoft Corp. — will join in this year, offering components of groupware systems or integrating related capabilities, such as messaging, into existing applications. Perhaps the best-known and all-encompassing example is Lotus Development Corp.'s Notes. Notes is also the most expensive: A standard 200-user license costs $62,500. However, users and vendors alike may spend the year just nailing down what groupware is. Some prefer to use the term "workgroup computing."

Videoconferencing

■ Spurred by nosediving corporate travel budgets, videoconferencing is among today's hottest emerging products. During the past two years, vendor revenue has jumped by 90% to $100 million and will hit $500 million by 1994, according to Wall Street research firm Tucker, Anthony, Inc.

Easy pieces

■ In.the operating system arena, expect to hear more about "microkernel" technology, which breaks a system's kernel into easily maintained pieces for use on multiple processors. Unix System Laboratories, Inc., the Open Software Foundation, IBM and others are working in this area, using MIX from Chorus Systems, Inc. in Beaverton, Ore.

ELECTRONIC DOCUMENT IMAGING

No image problem — sales set to take off

BY ELLIS BOOKER

It's nearly everyone's darling technology. So while other products might be feeling a pinch, investments in electronic document imaging systems will skyrocket in 1992.

Even as the economy sagged in 1991, companies continued to lay out precious dollars on imaging pilots and feasibility studies — preparing for what analysts say could turn into a watershed year for adoption and deployment of the technology (see chart).

Users "are putting imaging in place when business is slow, so they will be able to do more with fewer resources when business picks up," says Walter Novinger, a senior partner at Shaw, Novinger and Odell.

In fact, imaging revenue is forecast to double in 1992, surging to $1.9 billion, according to IDC/Avante Technology, a market research and consulting firm in Framingham, Mass.

More green lights

Bruce Lechner, a senior vice president at Technology Solutions Co. (TSC), a Chicago-based consultancy, says imaging projects that were delayed or deferred in 1991 will get a green light in the coming year. These will include some major projects among Fortune 100 companies, he adds.

Lechner, who runs TSC's imaging practice in Walnut Creek, Calif., says these installations will be bigger and more strategic than many in 1991.

With its promise of 20% savings and productivity gains, imaging will seduce even the biggest skeptics, IDC/Avante predicts. The firm says many users will be attracted by the promise of smaller staffs, quicker customer service, reduced transcription errors, fewer lost documents and reduced paper storage. Imaging lets companies redesign procedures for handling paper, analysts note.

Imaging will also get a big boost from the frenzy of vendor activity, analysts say. "1992 will be the first year that all major systems companies will be competing," says Scott McCready, director of image management systems at IDC/Avante.

Established players such as Wang Laboratories, Inc., IBM and Unisys Corp. will be joined by the likes of Digital Equipment Corp. and NCR Corp., which announced image products in 1991.

Watch for DEC to release a second version of its Imageexpress, a VAX 4000-based system introduced in January 1991. Wang, the granddaddy of imaging vendors, plans to release an IBM RISC System/6000 implementation in the spring. NCR is expected to announce important products about the same time.

Unisys, with its Infoimage products for banking, engineering and commercial settings, says it will introduce a work-flow product — either its own or one from a third party — sometime in 1992.

The heavier competition will put pressure on industry-leading pioneers such as Filenet Corp., as well as a crush of smaller companies and systems integrators. To stave off the systems companies, these firms will try to attract customers with marketing relationships with third-party vendors and innovative software.

Hotter competition could also result in consolidations among small to midsize vendors, Novinger and McCready agree. "Vendors are discovering it's no longer sufficient to sell a client hardware," Novinger says. "They have to write applications . . . and the number of companies that can do that is not large."

Indeed, analysts agree that software — not hardware — will increasingly be a prime differentiator between products and vendors.

Probably the hottest category is "work-flow automation systems," which let IS departments or users create rules for routing digitized documents and files among individuals, departments and applications.

The ability to let users customize imaging software will be another much-desired feature. While imaging systems are far easier to deploy now than they were a couple of years ago, analysts caution that the software still needs much postinstallation tweaking. For this reason, buyers should expect little in the way of shrink-wrapped imaging systems in 1992.

Another thorny area that users and vendors alike will grapple with in 1992 is integration. Key questions include things such as how one department's "image-enabled" application can be attached to existing workstations, networks and applications elsewhere in the company, for instance. Little wonder the number of commercial systems integrators and vendors who will advise users in this area is skyrocketing.

Continuing in 1992 will be vendors' march to support a variety of hardware platforms and operating systems — notably, Microsoft Corp.'s Windows 3.0 and OS/2. So will support of open network protocols and third-party software tools and peripherals.

Standards for imaging, specifically in compression/decompression and indexing, will also mature next year and be quickly embraced by imaging vendors. Even with all the action, some vendors will be moving into a new arena: office automation. Most imaging installations to date have targeted production functions such as processing bank checks, insurance forms and birth certificates, McCready says.

The newer imaging systems will be geared toward smaller groups of users and will feature ad hoc queries into multiple image databases. Basically, the systems treat images as just another data type that can be manipulated by the office automation system.

Yet, while more single-user or small work group (under 10 workstations) imaging products will appear in 1992, McCready says major players will continue to concentrate on larger, production-oriented applications.

Everyone is imaging

More than 90% of businesses polled plan to install or expand electronic document imaging systems in 1992

First-timers outnumber upgraders 3-to-1 ...

■ Expand current system
■ Install new system

Number of respondents (Base: 751)

... as overall spending on imaging rises

Percentage of total IS budget	1991	1992
Less than 10%	30%	24%
Between 10% and 49.9%	18%	24%
More than 50%	8%	10%
No answer	44%	42%
	(Base: 461)	(Base: 479)

Based on a survey of 825 AIIM members and conference attendees

Source: Datapro Research Corp.

CW Chart: Marie Haines

STATE OF THE OFFICE 1992

Compiled by Michael Alexander
Designed by Michael Siggins

MULTIMEDIA

Opinions vary on the market growth of multimedia, a technology that combines text, graphics, animation, audio and video on personal computers. But even the most conservative observers, including Market Intelligence Research Co. (MIRC) in Mountain View, Calif., say sales of related hardware and software will grow dramatically during this decade. MIRC predicts that sales of multimedia will soar from $790 million in 1991 to $1.3 billion in 1992.

Analysts predict two factors will aid acceptance of this technology in 1992: greater cooperation among vendors (such as the IBM/Apple Computer, Inc. alliance) and broader acceptance of international standards compressing and manipulating full-motion video on the desktop.

Several other industry leaders, including Intel Corp., Tandy Corp. and Microsoft Corp., will continue to tout multimedia loudly in 1992.

CD-ROM

Riding the coattails of multimedia, optical discs — specifically, the 4.75-in. format pioneered by Sony Corp. and Philips Telecommunications N.V. — will likely get a boost in 1992. Some analysts say compact disc/read-only memory (CD-ROM), whose installed base is predicted to double in 1992, is approaching critical mass in commercial acceptance. The number of CD-ROM titles will total 10,860 in 1992, up from 5,916 in 1991, says Infotech, a market research company in Burlington, Vt.

The coming year will also see two alternate multimedia formats: Philip's compact disc-interactive and Commodore's CD-TV will come under close scrutiny, especially as educational and training vehicles.

PARALLEL PROCESSING

Look for massively parallel processing computers, which tackle a task with hundreds or even thousands of microprocessors, to make a small but forceful push into the commercial market in 1992. Vendors such as Thinking Machines Corp. and Intel have already sold machines to American Express Co. and Prudential Securities, Inc. Other companies are likely to follow the leaders, some analysts believe.

More importantly, the fear, uncertainty and doubt that surround the programming of parallel machines will continue to subside in 1992, as potential buyers begin to recognize that the task is not as daunting as they once believed. In 1992, compilers will continue to get better at automatically "parallelizing" code. In addition, much effort will go into developing software tools for porting, developing and debugging software for parallel machines.

GRAPHICAL USER INTERFACE

Voice recognition and speech synthesis, as well as pen-based computing (see story page 40), will go a long way toward smoothing the human-to-computer interface starting this year. But it will be several years before applications using these interfaces are commonplace.

In the interim, graphical user interfaces (GUI), especially Microsoft's Windows 3.0, will continue to enjoy tremendous growth, many analysts agree. Sales of the Apple Macintosh interface will remain steady, and Next, Inc.'s Nextstep is expected to have only a small impact, according to analysts at International Data Corp. (IDC).

Of the GUIs based on the X Window System, the Open Software Foundation's Motif will fare best, thanks to its visual link both to Windows and IBM's Presentation Manager, IDC predicts.

IBM's Presentation Manager hangs on the success of its OS/2 operating system, which is slated to hit the market in 1992, after considerable delays. Some analysts are betting on Presentation Manager as a long-term success story.

OBJECT ORIENTATION

Object-oriented programming systems, which allow programmers to assemble applications in modular, Tinker Toy fashion, will find greater appreciation in 1992 (see related story page 42).

Backers say object orientation promises to simplify systems development and maintenance because code can be reused for a variety of applications. More importantly, object-oriented technologies let businesses adapt quickly to critical business changes, according to Andersen Consulting.

ARTIFICIAL INTELLIGENCE

As companies struggle for competitive advantage in an increasingly service-oriented market, AI will continue to join the mainstream, according to Gartner Group, Inc. So will technologies relating to expert and knowledge-based systems, neural networking and fuzzy logic. Object-oriented programming will also drive these technologies because it eases applications development.

Dynamic changes in the neural networking market will continue in 1992, says Cognizer Co., a market research firm. The company expects more neural networking chips and custom applications to debut this year.

EDITORIAL

Home atone

In the year ahead, as in the one just finished, the dominant force shaping the IS professional's environment will not be technology, as had been the case for decades, but the economy. The only difference between 1991 and 1992 is that our sputtering economic engine will affect your world more strongly — and in a negative way, for the most part.

This isn't the way we like to greet the new year with our Forecast issue. But one quick look at the numbers will tell you that we're still in deep sneakers: 20,000 at IBM; 75,000 at General Motors; 33,000 at Sears; and tens of thousands at hundreds of other companies.

These aren't just numbers. They're jobs that are being lost. Unlike in past recessions, economists believe they are being lost permanently.

These are workers, increasingly white-collar, whose incomes either will decrease dramatically as they slide into early retirement or will disappear entirely as they are laid off.

These are billions of dollars in wages that won't be spent on your company's products and services, unless you're in the outplacement or outsourcing business. These are part of a vicious cycle of recession and layoffs that seem immune to the most ardent government policies to stimulate the economy, such as fostering the lowest interest rates in a generation.

The reaction from our Washington politicians is oh so predictable and can be summed up in one word: protectionism. That's just a great idea. Do those birdbrains realize that the U.S. companies that make up the one nonmilitary industry we dominate — namely information technology — export more than half their output?

Underlying all our problems are the grievous sins of excess of the 1980s, when too many people, corporations and government institutions spent far beyond their means. Their debts have to get paid down before we, as a nation, begin to build anew. Meanwhile, information technology is the means of production with the greatest potential to do more with less. The problem, as we've noted, has been in realizing that potential to any measurable degree.

If there's any real hope in the current picture, it rests in the aphorism that out of adversity springs genius. So much attention has been focused on the utterly dire situation the U.S. found itself in 50 years ago, when a different peril threatened the way of life here. Not only did the country meet that challenge, but it also took off on four decades of economic boom, given a dip here and there.

The main ingredients in the recovery from the 1930s and World War II were raw materials and raw muscle. The key success factor of the 1990s will be raw intelligence.

Let us pray that we as individuals use this input to its fullest and that our friends in Washington start to jump on the same bandwagon.

Bill Laberis

Bill Laberis, *Editor in Chief*

LETTERS TO THE EDITOR

Sound advice

Thank my good fortune I read your recent Fast Track column [CW, Oct. 28] regarding possible layoffs.

My co-workers, or should I say former co-workers, disregarded the writing on the wall. I must admit that I too was fat, dumb and happy after nine years with my ex-employer.

I started looking for a new position, as advised by the article, figuring, "What could it hurt?" They were right!

Now I'm in a better job, got a significant raise and actually feel challenged growth-wise for the first time in years.

My former co-workers are going through changes, too ... unfortunately, they are dealing with the Texas Unemployment Commission.

Hats off to your authors.

K.J. Eichenlaub
Houston

People the problem

In regard to "Cash drain, no gain" [CW, Nov. 25], who died and made information systems departments responsible for "enhancing U.S. economic performance?"

The idea that technology is the total answer to the complex issue of producing and trading globally is absurd.

In my years in the IS world, I have learned one thing: When you have a problem, it is usually with the people, not the technology per se. Are IS professionals learning to ask the right questions, see the big picture and remember that they are a service organization? Is IS management letting staff participate in technical decisions? Have businesses truly realized they must produce a quality product to compete?

Our world is complex now, and to solve problems, you must work as a team, involve and value all players, review your progress constantly to see what works and what doesn't and embrace change and creative thinking from the highest to the lowest levels of the business.

IS has a big part in making this happen — but most businesses just won't accept the changes that have to be made in management styles.

Linda K. Preston
Project Manager
Computer Management Services, Inc.
Ukiah, Calif.

Poor stereotype

With much grief, I read "Computers crack down on child support" [CW, Dec. 2].

The technical issues of the article were correct. What I disagree with is the sexism that was rampant throughout the article. Since I personally know five fathers who have custody of their children, and four of those mothers either do not pay their court-ordered support or have fallen behind, I feel the blanket use of men as the noncustodial parent is unfair.

A more correct manner of handling this article would have been to have discussed custodial and noncustodial parents. An example would be, "The system manages 300,000 child-support cases, from the moment a custodial parent applies for child support to the distribution of money that has been collected." That would not have changed the content of the article, but it does not paint anyone in a bad light.

Please stick to the technical aspects of information systems that *Computerworld* is known for. This kind of sexism is as bad as "dumb blonde" jokes.

Thomas Burrows
Columbia Consulting Corp.
Dallas

Clarifying NT

There are a couple points I would like to clarify in regard to "Ace in the hole? Not!" [CW, Oct. 28].

- We are developing a single product — Windows New Technology (NT) — for the Advanced Computing Environment. This product has the ability to run many different applications.
- We are doing a lot to build connectivity into the Windows NT environment. We are implementing Netbeui and TCP/IP protocols into LAN Manager for Windows NT.
- Yes, Windows NT looks like Windows — that's the whole point. With 7 million users and 4,900 native applications, we want one robust, industrial-strength operating system to be as familiar and easy to use as Windows and to support a broad range of applications.

Carl Stork
Director, Windows NT Business Development
Microsoft Corp.
Redmond, Wash.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail:* COMPUTERWORLD. *Please include a phone number for verification.*

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The siren song of new machines

RICHARD A. KATZMAN

After reading Gary Loveman's recent article "Cash drain, no gain" [CW, Nov. 25], I cheered loudly. That article was one of the few attempts I've ever seen to explain a situation that people have been complaining about for more than 25 years — the fact that U.S. companies have spent billions on powerful technology to do things faster and better yet realize few, if any, productivity gains.

We all hear a lot about success stories. But most of the articles written about successful information services efforts reflect nothing but propaganda conceived to hide wasted, unproductive efforts. To guard against any negative reactions from stockholders and corporate officers, companies push out positive press releases by the ton.

The major problem, which is usually ignored or rationalized, is that technology is far ahead of the human capability to think and analyze in real-world situations and real-world organizations. The result is that people wanting to appear "leading edge" rush to buy products they do not understand and will not need for many years.

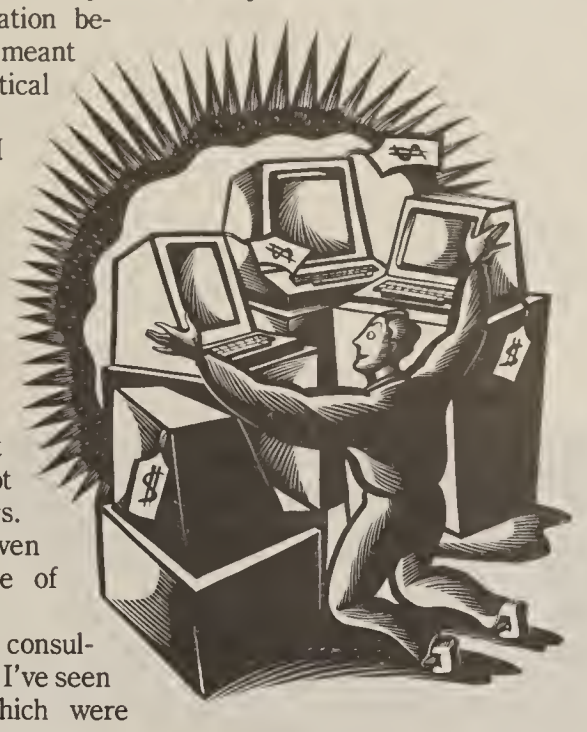
I currently use an Intel 80286 PC. It is the type that would allow me to enjoy the alleged benefits of an 80386 computer by simply purchasing a new motherboard. When people hear that I have a 286, however, they almost invariably ask, "What are you waiting for?" When I say that my 286 is more than sufficient, their shocked response is usually something like, "But you are already a generation behind!" . . . as if that meant anything from a practical point of view.

When I was at IBM years ago as a systems engineer, I was supposed to talk clients into buying new computers to help my employer generate new revenue. Strange as it seemed to my managers, most of my clients did not need new computers. They were not even making optimum use of their old ones.

More recently, as a consultant and an IS auditor, I've seen many companies, which were doing a fine job with the computers they had, succumb to pressure from a sales representative or the urge to buy a machine, just because they'd heard a competitor had gotten one.

To make matters worse, many companies select the most ludicrous tasks possible for computerization. In this respect, I must confess to a sort of contributory crime myself. As an IBMer, my job was not to sell computers that would benefit the client company but those whose sale would benefit IBM.

Applications in the operational or decision-making fields were not stressed because they took too long to install and prolonged the day when IBM could start



Linda Bleck

making a profit from the sale. The emphasis was on quick-installation applications such as payroll, which offered low payback and 99% of the time could have been handled more economically and efficiently by a service company.

Newer computers and allegedly better technology provide more information. The only problem is that people do not typically know what to do with the information they already have. What are they going to do with more?

As Loveman pointed out, most companies and organizations still function with structures and procedures reflective of the 1950s.

Management crutch

Computers, which can quickly solve voluminous exotic formulas and print out thousands of pages of allegedly valuable information, may seem like the logical solution for what we keep hearing are today's more complex management problems. But is management really more complex, or is it just that managers are less competent? My suspicion is that many of those making the decisions in organizations today are confused and fearful — and that when they buy computer systems, what they are really doing is grasping for a magical answer machine.

To one who has worked in the trenches of data processing for more than three decades, Loveman's conclusions are not surprising; neither is the information that money is being wasted for systems that miss their productivity targets.

The only thing that is surprising is that so many people in so many organizations seem not to recognize that it is time to put a stop to uncontrolled acquisitions and unfulfilled expectations.

Katzman, a certified data processor and IS auditor, operates an international consulting business in New Cumberland, Penn.

Ready! Set! Go! The year 2000 is almost here

MICHAEL COHN

This is the time of year for reminiscences and predictions. Reporters are busy retracing the '80s, while book authors expound on the '90s. I say we should forget all that and just jump ahead to 2000.

The big date is practically staring us in the face. The next eight years are going to fly by, except for maybe one week next summer when I have to watch my sister's kids. So my advice is to start planning now if you want to stay in step and possibly improve your odds of snagging a bigger cubicle.

Computing 2000

• **Personal computing.** Voice recognition will have replaced the keyboard, and everyone will have flat, high-resolution crystal screens. All of this will be great, except that we'll all be talking to these little magazine-size computers and you'll never know if the guy next to you on the subway is building a complex spreadsheet or if he's just another weirdo.

If you want to buy a computer, it will be out of a catalog, unless you go to the only megacompany left with the size, history and corporate culture to keep selling during these tough times — Amway.

• **End-user anarchy.** End users will sneak computer-aided software engineering into every company, and things will get out of control as they design their own applications, generate their own code and genererally try to act like real programmers. Worst case: This will cause catastrophic shortages of cigarettes, Far Side calendars and other crucial IS staples.

End users pose a serious threat to life as we know it. Think about that the next time you get one alone in an elevator.

• **Programming.** Of course, if you're a big corporate code grinder, you don't have to worry — your job is safe. There will be lots of development projects in the year 2000 . . . most of them the same ones that are being worked on today.

Services 2000

• **IS consulting.** You think it's tough now? By 2000, consultants will be a dime a dozen, and customers will have a field day. They'll make us meet or beat everyone else's advertised prices, and a program will have to be coded in 30 minutes or less or the next one's free.

• **After outsourcing.** People will be bored with outsourcing by the end of the decade. The new hot trend will be "out-outsourcing," where little outsourcers are forced to outsource to even bigger outsourcers. This will keep going until there are just two mega out-outsourcers left, who will mistakenly outsource to each other.

• **Downsizing.** Mainframes — or the few of them that are left — will be tiny. Midrange machines will be minuscule. PCs will have long given way to laptops, which will have become palmtops, which will have become wristtops. Sub-atomic-bit memory will drive tapes and disks down to the size of a tea bag.

Want to take advantage of downsizing in the year 2000? Start selling those metal detectors like they use at the beach for locating spare change. You'll need them just to find half the equipment in the computer room.

Buzzwords 2000

• **New measures.** By the year 2000, mega and giga will be considered puny. We'll probably have "humongabytes" or "zigabytes" or some other number, which will equate to the amount of storage you have to buy for the salesman to make his quota.

• **The name game.** They used to call us "data processors" and "propellor heads." When we finally became "MIS," we thought we were getting somewhere. But we lost the M in the late 1980s and became just "IS." If the trend continues, we'll be down to just "systems" in a few years . . . unless we go with only "information" and really confuse the folks who try to reach us at 411.

Cohn works at a very large computer company in Atlanta.

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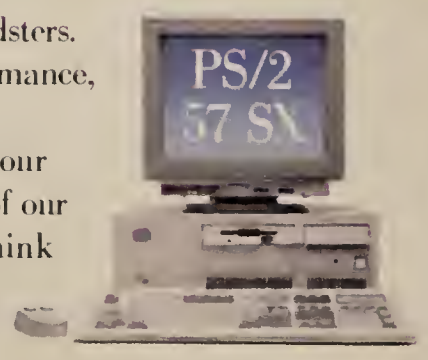

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NEW DEALS

PTT taps Unisys

The German telecommunications authority **Deutsche Bundespost Telekom** recently ordered more than $40 million worth of **Unisys Corp.** Unix-based systems. The agency, which already uses more than 50 Unisys U 6000 series machines, plans to acquire more than 160 U 6000/75 multiprocessors for commercial and technical applications.

Unisys also announced the sale of U 6000 systems to **Xtra Corp.**, a Boston-based transportation firm, for use by Xtra's over-the-road trailer leasing group, **AJF Leasing** in St. Louis. AJF will use the systems to automate 56 branches nationwide.

Arnold Air Force Base in Tullahoma, Tenn., recently granted **Convex Computer Corp.** a four-year contract. The vendor will provide Convex with C3800 supercomputers, maintenance support, training, analyst services and documentation for the Arnold Engineering Development Center. The agreement is valued at $14.8 million, and deliveries are set to begin in January.

An ounce of prevention for performance cure

BY GARY H. ANTHES
CW STAFF

NASHVILLE — Products for analyzing systems performance are proliferating and improving, but some users say they have a better idea: Why not find performance and capacity bottlenecks and remove them before applications go into production?

"We have all the tools," said H. Pat Artis at the Computer Measurement Group (CMG) '91 conference here recently. "But it's like the military — we're always prepared to fight the last war. It's the new applications that do you in." Artis, who is president of Performance Associates, Inc. in Palm Desert, Calif., added, "You need to look at capacity planning as part of application design."

Predictive products

A growing family of tools, some shown here for the first time, allow users to do just that. Chicago-based Windtunnel Software, Inc. showed a product, Performance Architek, that creates predictive models from design specifications imported from computer-aided software engineering (CASE) tools.

Technology Solutions Co. used the product to help design two 600-user local-area networks for a major appliance manufacturer. Bill Pierson, principal at Chicago-based Technology Solutions, used the tool to evaluate options for Unix-, DOS- and OS/2-based workstations, for sizing servers and for locating application bottlenecks. Input to Performance Architek came from benchmarks for hardware components and from application designs via two standard CASE tools.

"It's a consumer services application, and they have to respond to customer telephone calls very quickly," Pierson said. "The results predicted are what we're getting today, and that is very comforting."

DB2 tune-up

Pierson said the approach enabled the prediction of end-to-end response time allowing for the performance of workstations, servers, the networks and two IBM 3090 mainframes with DB2 applications. He said the modeling allowed DB2 to be tuned for better performance, and it enabled the project team to sell management on the need to use bigger IBM OS/2-based

Continued on page 54

Bank enlists neural net to fight fraud

ON SITE

BY KIM S. NASH
CW STAFF

PITTSBURGH — The holiday rush will soon be but a fond memory for shoppers, but Mellon Bank Corp. will be dealing with the repercussions well into 1992. The bank's Mastercard and Visa cardholders rang up about 3 million transactions in November and December.

Those may be the two busiest months of the year for cardholders, but credit-card crime knows no season.

To fight back, Mellon Bank is testing a mainframe-based neural network designed to flash warning signs when it finds potentially fraudulent transactions. This year, the bank expects to swallow a bitter $3 million fraud-related pill when it closes the books on 1991 financials, according to Philip Samson, vice president and portfolio performance manager. The 18th largest bank in the U.S., based here, wants to curtail fraud losses in the coming years.

"We want to better protect our cardholders and ourselves," Samson said.

System too simplistic

Right now, credit purchases are monitored with an in-house-developed, rules-based system. The system triggers a request for positive customer identification if activity on the card is unusually high or if a purchase exceeds a preset dollar amount.

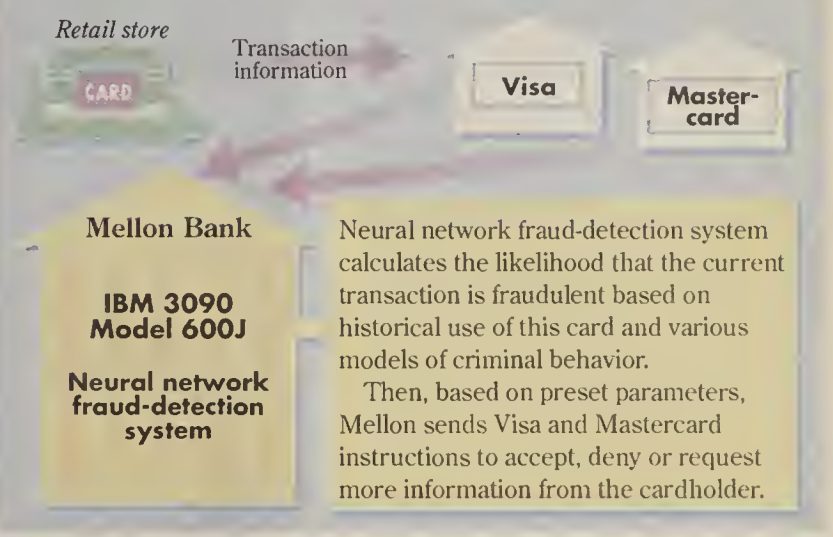
However, this method is too simplistic, according to Samson. "Fraud changes all the time. Criminals constantly try to outdo the banks," he said.

As Mellon Bank's resident expert on neural networks, Samson is overseeing a pilot of the Fraud Detection System (FDS), an application from Providence, R.I.-based Nestor Corp. FDS will "learn" to recognize irregu-

Continued on page 55

Crime stopper

Mellon Bank's Fraud Detection System will warn of possible credit card crimes before they progress to the bank's bottom line



CW Chart: Michael Siggins

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Capacity on parade

Attendees at CMG '91 saw an array of new products geared to making capacity planning and performance measurement easier as well as applicable in a wider variety of circumstances, including networks of heterogeneous systems.

Legent Corp. in Vienna, Va., showed five recently introduced products for personal computer-based access and manipulation of mainframe performance data. A sixth product, to be introduced early in 1992, provides end-to-end response time and other performance information for Token Ring networks to IBM mainframes.

Computer Associates International, Inc. showed a new release of CA-PMA/Look, adding CA's new windowed user interface, called Viewpoint, for real-time MVS systems performance monitoring. CA also showed CA-PMA/Performance-review, a recent product for on-line analysis of historical performance data.

Boole & Babbage, Inc. demonstrated enhancements to its Mainview for MVS products, including MV Manager for MVS, to be announced in the spring. It offers user-tailored as well as 150 predefined windowed views of MVS work load activity and systems information.

Systar, Inc., in Herndon, Va., introduced a workstation package consisting of its Enterprise Intelligence Systems (EIS) software and an Intel Corp. 80386-based PC for IBM mainframe data center managers. EIS is for high-level surveillance of system performance, and its new release offers 12 new CICS graphs for monitoring task workloads by transaction class.

HARDWARE SHORTS

Alliant unwraps supercomputer

Alliant Computer Systems Corp. has unveiled the Campus/800, a massively parallel processing supercomputer. The system has reportedly achieved a price-per-billion floating-point operations per second (GFLOPS) level that is two times better than that of the new top-of-the-line Cray Research, Inc. Y-MP C90.

A Campus/800 configured with 192 reduced instruction set computing processors and 4G bytes of memory achieved 4.781 GFLOPS performance on the Massively Parallel Linpack benchmark.

A fully configured Campus/800 provides 800 processors with a peak rating of 32 GFLOPS and has 128G bytes of memory. The Campus/800 is priced at $5.21 million for the 192-processor configuration.

Prevention for performance cure

CONTINUED FROM PAGE 53

computers. "It let us hedge our bets on the budgeting side," Pierson said.

BGS Systems, Inc. in Waltham, Mass., showed its Crystal Performance Evaluator, which predicts DB2 performance and requirements. The tool allowed Southern California Edison to avoid computational gridlock in its new, mission-critical Customer Support System (CSS).

According to Bill Hargrove, senior research planning analyst at the utility, the old system for order processing, billing and accounts receivable — the one being replaced now by CSS and "the application that constantly drives us to the latest and greatest IBM machine" — takes up two-thirds of an IBM 3090/600J; it also uses 100G bytes of on-line storage and accounts for more than 1 million transactions per day.

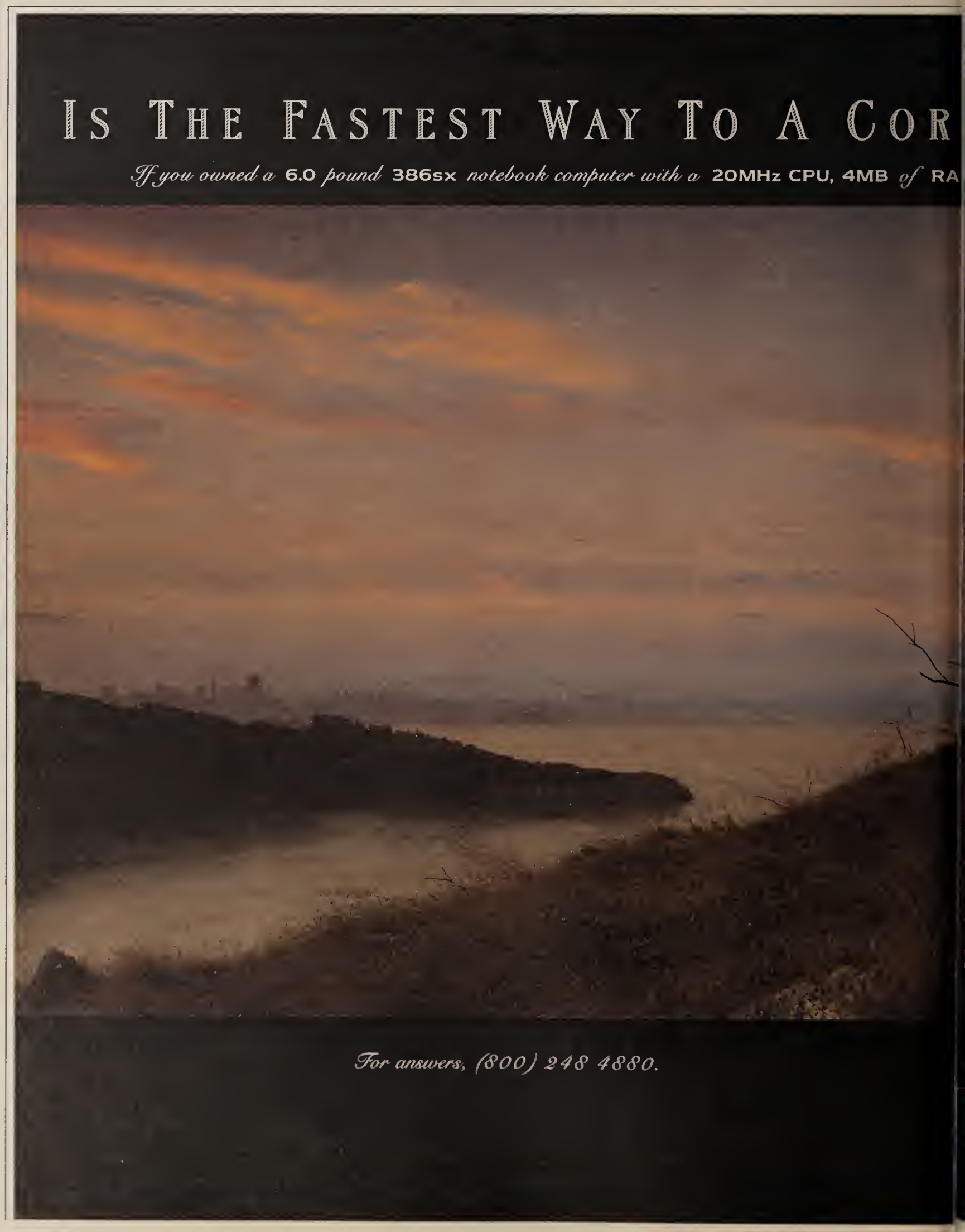
Crystal found flaws

When Hargrove used Crystal to evaluate test code for a key CSS subsystem, some resource-gobbling flaws were discovered. "We found cases where we were executing sections of code many, many more times than necessary — like thousands of times," he said.

According to Hargrove, the modeling gave the utility company confidence in its resource planning early in the development cycle. "Without it, capacity planning would have been more of a crapshoot," he said.

BGS's Crystal Performance Evaluator is not a new product, but the company did introduce an adjunct product at CMG '91. Called Crystal DB2 Extractor, it automates the building of a model of a DB2 application by reading the DB2 Catalog and Plan Table for table, index and SQL access information.

Metron Systems, Inc. in Rockville, Md., made its U.S. debut of Athene at the CMG show. Athene is a capacity planning tool for performance forecasting in a variety of environments, including MVS, VMS and Unix.



Omegamon for DB2 tracks source of problems

BY JEAN S. BOZMAN
CW STAFF

LOS ANGELES — Candle Corp. has found a way for users to watch how IBM DB2 relational databases use up their disk drive resources. An enhanced version of Candle's Omegamon for DB2 monitor, introduced in early December, allows users to observe the impact of individual SQL statements on mainframe disk drives.

The new Omegamon II for DB2 contains an Object Analysis module that shows I/O activity generated by specific DB2 tables and assigns that I/O activity to specific disk drives. "We're doing control block sampling of DB2 and MVS," explained Buff Jones, director of Candle's database solutions group in Houston. Users can use DB2 tools from Candle and other vendors to correct performance problems by moving DB2 tables and indexes around in the disk drive memory spaces, she said.

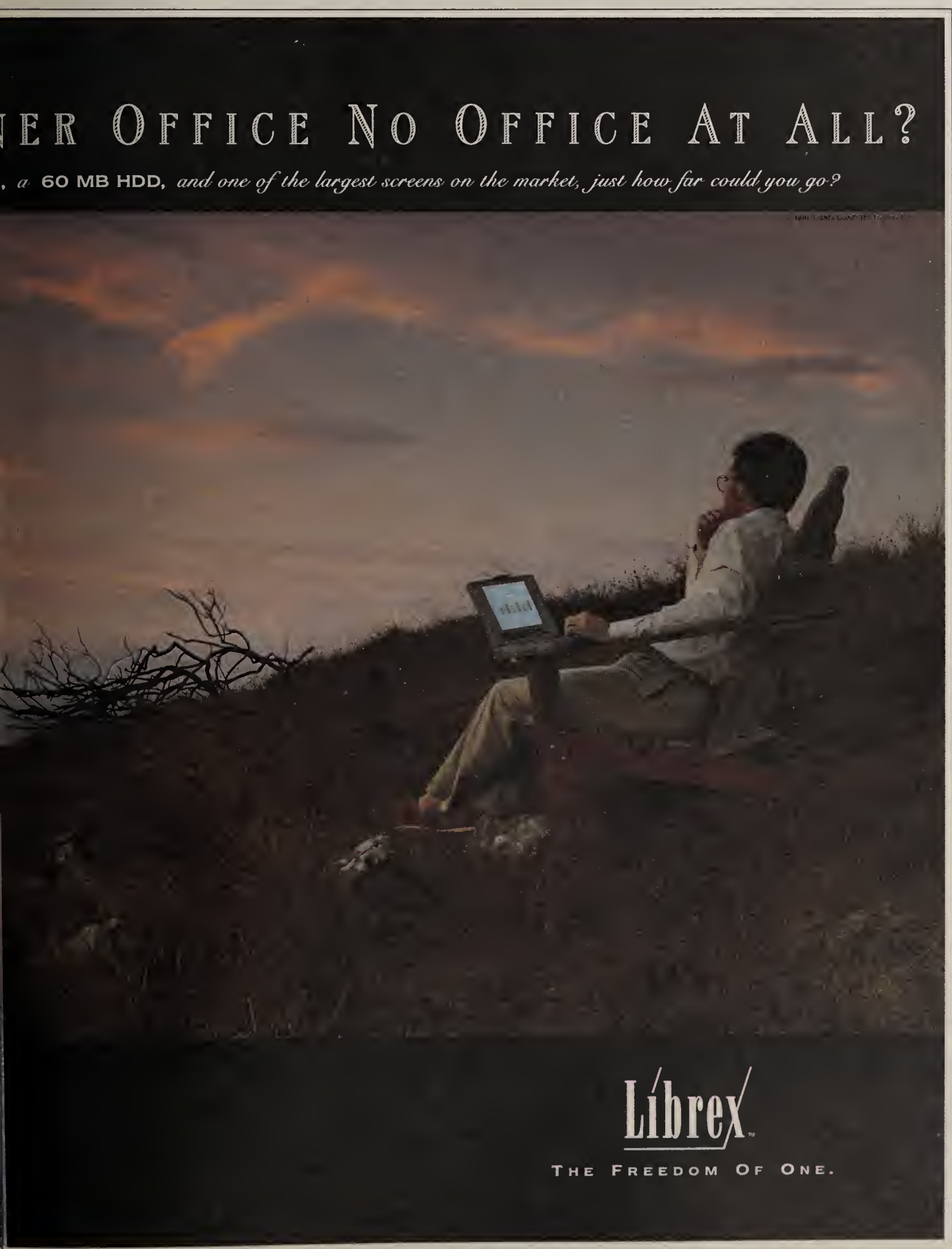
"This is a more granular look within DB2 itself," said Fred Joy, a senior research analyst at Meta Group, Inc. in Westport, Conn. "It gives database administrators the ability to look into a [disk] pack on which DB2 resides and also the ability to look into pools of memory." Performance problems can be identified down to the level of DB2 logical "threads," or individual requests, he said.

One beta-test site, Southern California Edison in Rosemead, Calif., has been using the enhanced Omegamon monitor for several months. The site has six copies of DB2, said John Graham, a senior systems programmer. "We stressed the product pretty well," Graham said. "This product helps you decide whether there is a problem — and which DB2 object is causing that problem."

At The Williams Cos.' Information Services Division in Tulsa, Okla., the repair tool is another Candle product called DB/DASD. "When the Object Analysis process is turned on, we can tell what objects need to be moved around on the disk drives," said Steve Sossamon, database administrator.

Unlike a database "trace" function, which occasionally samples DB2 performance, the Object Analysis program runs in real time, Sossamon said. That way, it can be used to restore DB2 performance when response times lag.

Omegamon II for DB2, which is being shipped to customers, is priced from $35,000 to $61,500, depending on the size of the computer that hosts it. The package runs on IBM mainframes under MVS/XA or MVS/ESA operating systems and supports DB2 Version 2.2 and later releases.



Bank fights fraud with neural net

CONTINUED FROM PAGE 53

lar charge-card patterns, then rate the situation on a fraud possibility scale.

For example, the fictitious Joe Charger typically uses his Visa card twice a month, once at a restaurant and once at a local department store. Suddenly, Joe apparently starts running up four or five purchases over a week's time.

The next time Joe's card is passed over a shopkeeper's counter or his number is presented to an order taker over the phone, FDS will match current buying patterns against Joe's charging history and spit back either a flat denial or a prompt to ask for positive identification.

"The neural network can see patterns of activity a busy human can't," Samson explained.

Putting FDS to work

Plans call for the finished FDS to be set up on an IBM 3090 Model 600J mainframe at Mellon Bank's Pittsburgh data center. FDS will be tied into Visa's and Mastercard's authorization centers.

When a shopper presents, for example, his Mastercard to a merchant, the merchant transmits pertinent data to Mastercard, which sends it to the card issuer, Mellon Bank. FDS will then calculate the chances that this purchase is fraudulent and issue one of three instructions: accept, deny or refer. A referral means the salesperson must ask the customer for proof of identity.

"Cardholders aren't always cardowners," Samson said.

Although he would not say what the application cost, Samson claimed it did not break the bank's bank. The information systems budget for Mellon this year was $194 million, according to information supplied for the 1991 *Computerworld Premier 100.*

The pilot, which will be run standalone — unconnected to Visa or Mastercard — will be ready to roll in three months, according to Samson. He and two other IS people must first finish gathering actual credit-card records to feed into FDS. A model of six months' worth of real credit transactions by the bank's 1 million active customers will be the history on which FDS will draw to discern and predict criminal scams recorded in the subsequent two months. By the spring, the team should know whether FDS is worth installing wide-scale, Samson said.

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COMMENTARY

James Daly

Pen market lost for words

"We never talk about anything we plan to do, but now we are."

— M. Kathy Vieth, vice president of tablet systems at IBM

"We're not talking."

— John Sculley, chairman of Apple

"There is a lot to talk about here."

— Richard Shaffer, editor of "Computerletter"

Confused? Don't be. What everyone is, isn't, will and won't talk about is the pen-based computer market, which lately has generated more hot air than a jumbo jet on takeoff.

Part of this is nervous chatter, as the industry tries to cover up the sound of its heart pounding while it desperately seeks new ways to make money in a flat PC market.

But the cacophony drowns out another sound that end users might be interested to hear. It swallows up a low industrial murmur emanating from Japan, a land where reserve draws more respect than a lungful of boasting and a delivered product is what really gets people talking. Despite all the noise that

Continued on page 60

IBM's reorganization could breathe new life into OS/2

BY ROSEMARY HAMILTON
CW STAFF

In the wake of IBM's announced reorganization, some industry analysts and users said its restructured personal computer business could actually help the long-troubled OS/2 operating system.

"What I've heard is the stated direction of OS/2 will remain strong," said Jack Blanchard, a senior consultant at Continental Bank in Chicago, an OS/2 user site. "OS/2 is still going strong in their minds, so we are relieved."

Earlier this month, an IBM spokesman said the reorganization would have "absolutely no impact on OS/2" when asked if the operating system might be de-emphasized in the new unit. He said the current OS/2 organization, which reports to Joseph Guglielmi, general manager of marketing and business development for IBM's personal systems, will remain in place.

The spokesman said the OS/2 shipment schedule remains firm. A limited availability version was scheduled for release by Dec. 31; general availability is planned for March 1992.

"It can only help" OS/2, said Scott Stein, an analyst at Technology Investment Strategies Corp. in Framingham, Mass., of the reorganization. Stein said the restructured unit will look to distribution channels such as mail order that could help promote OS/2 in new ways that were not pursued before.

Frank Michnoff, program director of desktop computing strategies at Meta Group, Inc. in Westport, Conn., said he also expects to see more flexibility in the way IBM markets OS/2.

"This could actually give them some more flexibility in pushing it forward in terms of pricing and bundling with hardware and alternative distribution channels," Michnoff said.

One user said he still has faith in a message delivered directly by IBM's James Cannavino several months ago. Cannavino is an IBM vice president and general manager of the Personal Systems line of business.

"We had a one-on-one with Cannavino, and I was very impressed that the man has the business under control," said Carey Serif, manager of applied technology at Huntington National Bank. "He confirmed that IBM believes OS/2 is very important . . . and a very high priority."

Looking strong

At least some industry analysts feel that OS/2 will show respectable growth after IBM's reorganization settles down

OS/2 shipments:

Year	Units
1990:	200,000
1991:	500,000
1992*:	800,000 to 1 million

*Projected

Source: Meta Group, Inc.
CW Chart: Janell Genovese

Aldus products arrive in seasonal time

BY CAROL HILDEBRAND
CW STAFF

Aldus Corp. bucked the holiday product announcement dearth with a spate of shipping products, plunking a trio of offerings down by the information systems chimney with care.

The Seattle-based company announced that Aldus Freehand 3.1 for Windows, Freehand 3.1 for the Apple Computer, Inc. Macintosh and Pagemaker Database Edition have all hit the shelves.

• Freehand 3.0 for Windows features a pasteboard-style work environment that lets users access tools, colors, styles and layers via use of floating palettes.

Becky Barlow, a prepress specialist at Image 4 Prepress in Baton Rouge, La., said the Windows version was a help in converting data brought in by clients from non-Macintosh environments. "It's very friendly to Macintosh Freehand," she said. "As an output service, people come to us needing PC output, and we sometimes have a problem converting the software. Having Freehand [for Windows] is very compatible."

• Freehand 3.1 for the Macintosh shipped simultaneously with its Windows-based cousin. It includes full support for Apple's System 7.0 operating system, as well as a pressure-sensitive capability for the drawing tool that lets a user specify line widths without going to the line style window.

Bob Bohannon, a geologist with the U.S. Geological Survey in Menlo Park, Calif., said that he has encountered some printing problems in the past. "I use rather big files," he said, "so anything they do is going to help."

Barlow said the new printing capabilities allow her to print from preprint mode documents with any links in them. "That's a pretty major accomplishment," she said, "because we try to print from preprint as much as possible."

• Pagemaker Database Edition. Pagemaker 4.0 for Windows can now be linked to database management systems via Pageahead, a spreadsheet-like interface developed by Pageahead Software Corp. Users can query, retrieve and format data from database files and move the data into Pagemaker files by means of Database Edition.

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COMPUTERWORLD

1992 Computerworld Editorial Calendar (January-June)

Issue Date	Ad Closings Color*	Ad Closings B/W	Editorial Feature	Show Distribution	Ad Readership Issue	Response Card Decks
Jan. 6	Dec. 20	Dec. 27	**Executive Report:** The Information Systems Contribution to Quality			
Jan. 13	Dec. 27	Jan. 3	**Product Spotlight:** Windows Applications			Mails: Jan. 15 Space Close: Dec. 6 Mat'l Close: Dec. 9
Jan. 20	Jan. 3	Jan. 10	**Executive Report:** Customer Service **Industry Closeup:** Automotive Industry			
Jan. 27	Jan. 10	Jan. 17	**Product Spotlight/Buyers' Scorecard:** LAN Management	Communication Networks Jan. 28-30 Washington, D.C. Windows OS/2 Jan. 28-30, San Jose, CA	Harvey Study	
Feb. 3	Jan. 17	Jan. 24	**Executive Report:** Using IS for Fast Track Product Development			
Feb. 10	Jan. 24	Jan. 31	**Product Spotlight:** E-Mail	Networld Feb. 11-13, Boston	Starch Study	Mails: Feb. 12 Space Close: Jan. 3 Mat'l Close: Jan. 6
Feb. 17	Jan. 31	Feb. 7	**Executive Report:** Beyond Sales Force Automation			
Feb. 24	Feb. 7	Feb. 14	**Product Spotlight/Buyers' Scorecard:** Accounting Systems			
Mar. 2	Feb. 14	Feb. 21	**Executive Report:** To Be Announced			
Mar. 9	Feb. 21	Feb. 28	**Product Spotlight:** Client/Server Application Development		Starch Study	Mails: Mar. 11 Space Close: Jan. 31 Mat'l Close: Feb. 3
Mar. 16	Feb. 28	Mar. 6	**Integration Strategies:** Pulling Macs Into the Enterprise Network **Industry Closeup:** Aerospace			
Mar. 23	Mar. 6	Mar. 13	**Product Spotlight/Buyers' Scorecard:** RISC Desktop Machines and Servers	DB Expo Mar. 23-26 San Francisco	Starch Study	
Mar. 30	Mar. 13	Mar. 20	**Executive Report:** To Be Announced			
Apr. 6	Mar. 20	Mar. 27	**Product Spotlight/Buyers' Scorecard:** PC Software—Fresh Application Categories and New Twists on Old Ones	Comdex Spring '92 and Windows World Apr. 6-9, Chicago		
Apr. 13	Mar. 27	Apr. 3	**Executive Report:** To Be Announced			Mails: Apr. 15 Space Close: Apr. 3 Mat'l Close: Apr. 6
Apr. 20	Apr. 3	Apr. 10	**Product Spotlight:** Printers Best Suited for a LAN Environment			
Apr. 27	Apr. 10	Apr. 17	**Executive Report:** To Be Announced		Starch Study	
May 4	Apr. 17	Apr. 24	**Product Spotlight:** Midrange Systems That Run Enterprises			
May 11	Apr. 24	May 1	**Integration Strategies:** Creating an "Open" Company **Industry Closeup:** Personal Care Industry		Starch Study	Mails: May 13 Space Close: Apr. 3 Mat'l Close: Apr. 6
May 18	May 1	May 8	**Product Spotlight/Buyers' Scorecard:** Routers	Interop East May 18-22 Washington, D.C.		
May 25	May 8	May 15	**Executive Report:** To Be Announced			
June 1	May 15	May 22	**Product Spotlight:** What the Well-Equipped Help Desk is Using			
June 8	May 22	May 29	**Product Spotlight:** MRP II			Mails: June 10 Space Close: May 1 Mat'l Close: May 4
June 15	May 29	June 5	**Special Edition:** Annual *Premier 100* Magazine (Ad Close: May 1) **Executive Report:** To Be Announced			
June 22	June 5	June 12	**SPECIAL SUPPLEMENT:** *Computerworld's* 25th Anniversary **Product Spotlight/Buyers' Scorecard:** Portable Computing (laptops, notebooks, pen-based and wireless technologies)	PC Expo June 23-25 New York City AIIM June 22-25 Anaheim	Starch Study	
June 29	June 12	June 19	**Executive Report:** To Be Announced			

* Includes ads placed within Executive Report or Product Spotlight sections and premium positions.

Please Note: Executive Report topics will be announced one month prior to ad closing. Your sales representative will provide you with specific information on each topic.

Avis cruising with Wizard IV into airports, training centers

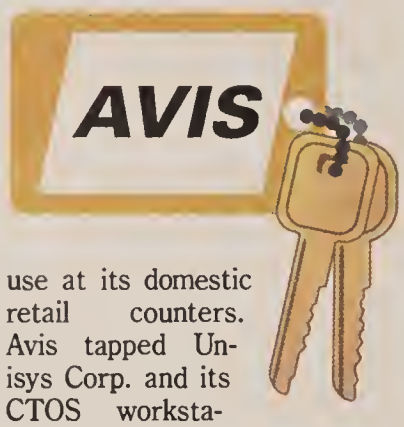
BY ELLIS BOOKER
CW STAFF

GARDEN CITY, N.Y. — Wizard IV, the fourth iteration of the Avis, Inc. car reservation system and the first to use distributed, intelligent workstations, is on track despite expected delays, according to a company spokesman.

"There have been slight, anticipated delays with cutovers but no major problems," the spokesman said. He added that Wizard IV is already in operation at Avis counters at John F. Kennedy International Airport in New York.

Next rollouts are scheduled for Avis' New York training center, Newark and LaGuardia airports and Avis locations in Manhattan.

Earlier this year, Avis began a replacement program for the 2,200 dumb terminals now in



use at its domestic retail counters. Avis tapped Unisys Corp. and its CTOS workstation for the first 100 systems in the $10 million U.S. portion of the project, which is expected to be completed by late 1993.

CTOS, an integrated systems and message-based network operating system, was created by Convergent Technologies, Inc., which Unisys acquired in 1988. Using the extensive Systems Network Architecture capabilities of the CTOS operating system, the workstations will be able to connect to Avis' IBM 3090 mainframe in Garden City or function independently if this network is disrupted.

Progress Software Corp. in Bedford, Mass., is under contract to Unisys to develop applications for Wizard IV using Progress' fourth-generation language, according to software industry sources.

Agents on Wizard IV will be able to access multiple databases at one time. The 7-year-old Wizard III system required agents to use separate terminals for each 3270 session, a slow and expensive process.

Alpha moves Four-ward

Firm introduces text OS/2 version, upgrade

BY CHRISTOPHER LINDQUIST
CW STAFF

BURLINGTON, Mass. — Alpha Software Corp. has announced the release of the latest version of its Alpha Four relational database as well as a text-based OS/2 version of the same product. Sales of Alpha Four have grown from 8,000 copies two years ago to 175,000 copies last year, according to the company.

Alpha Four Version 2 is billed as a relational database for nonprogrammers. New features include network support and a Powerscript scripting language that allows more complex applications to be developed than were possible with the previous version.

Users develop applications by developing an "outline" of the required application and then recording macros and customizing menus and screens. Programming is not required because macros can be recorded as the user walks through various menus. Lists of available commands can be called up with a mouse click.

Alpha Four also includes a report writer that lets the user "paint" a report just as it will appear when printed.

No conversion needed

The product supports a Netbios-based network. It has the capability to read Borland International, Inc., Dbase III and IV and compatible files directly without any conversion.

Pricing for both the DOS and OS/2 versions is $549 for a single-user version.

Local-area network packs are available in units of three, five and 30, priced at $749, $1,249 and $4,995, respectively.

The product is scheduled to be available this month.

Daly

FROM PAGE 57

vendors are making about the nascent pen-based computer market, when the time does come to purchase such a machine, it's a good bet you won't buy a domestic model, but a Japanese one.

Why? While U.S. companies yammer on, Japanese giants have already launched four handheld, pen-based machines that have gained a fair measure of success. Just as Sony hit the weight and price points with the Walkman, they have done the same with the Palmtop. The tidy little machine is already shipping 5,000 to 7,000 units per month, according to "Asia Pacific Update," a newsletter based in Menlo Park, Calif.

Conversely, domestic sales of pen-based systems are slow. Grid Systems sold only 10,000 machines in 1990, company President Alan Lefkof says.

When the Japanese companies are content with the success in their own country, they will launch international versions. Sony, for instance, is expected to introduce its Palmtop in the U.S. next year, and the others will follow suit.

U.S. companies aren't laggard — they were just caught dozing. Slate Corp. Chairman Vern Rayburn tells the story of visiting the Matsushita headquarters in Osaka and seeing a pen computer that was developed in 1982. That's 1982 — one year after IBM's introduction of their now-prehistoric Personal Computer. While domestic vendors boldly spell out what they might have next year, Taiwanese and South Korean firms are already building clones of Japanese pen-based machines.

Sure, there are plenty of examples of folks who thought up a brilliant idea, then sat on their hands while the rest of the world surfed off into the sunset on their brainstorm. Look at Xerox, which developed the graphical user interface at its Palo Alto Research Center and then fumbled the ball. You don't see Microsoft or Apple giving a whiff about competition from Xerox.

Japanese vendors building pen-based PCs have been further coaxed to excel by the Japanese people. In no other country are the simple pleasures of reading and writing more acutely appreciated than in Japan. Books and magazines sell like french fries, and the country enjoys a nearly unheard of 99% literacy level. Is it any wonder the Japanese are pouring money into their pen-based R&D efforts?

In Japan, only three out of 10 desktops have a PC. "It's very possible that the Japanese may skip a generation and go right to pen-based computing," said Phac Le Tuan, manager of Macintosh system software at Apple.

U.S. vendors are not completely blind to the prowess of their overseas counterparts. Slate will announce a joint software development and distribution pact with a Japanese vendor next month, and other firms are also setting up alliances.

However, the Japanese head start is already impressive. Their lead is clear, widening and coming to a town near you.

Daly is a *Computerworld* West Coast senior correspondent.

CAD/CAM doctors 3-D medical models

BY KIM S. NASH
CW STAFF

"Cutting-edge" might be both a literal and a figurative description for what the folks at Ethicon, Inc. do. At the Cincinnati-based medical supply company, engineers wield fresh-from-beta-testing CAD/CAM gear so doctors can brandish smaller, more accurate tools for tricky operations.

Ethicon, a subsidiary of Johnson & Johnson, designs and builds tiny scalpels, scissors and other surgical instruments sold to hospitals and medical centers worldwide. They do it on Sparc 2 and 2+ workstations from Sun Microsystems, Inc. running CADDS-5, a new version of computer-aided design and manufacturing (CAD/CAM) software from Prime Computer, Inc.'s Computervision unit.

CADDS-5 lets users model objects in three dimensions.

Doctors performing routine operations, such as gall bladder and appendix removal, can now operate by inserting tiny cameras in the body through small incisions. Substituting quarter-inch cuts for traditional five- or six-inch slices can mean shorter, cheaper hospital stays for common procedures.

Along with sutures and other medical supplies that composed Ethicon's $1 billion in sales last year, the company makes the small tools that are attached to the camera probes.

Although rotating-head skin staplers might not conjure up pleasant images for most people, Ed Biehl is pretty happy about them. Last year, Biehl, a feasibility designer, helped draw up Ethicon's plans to manufacture the instrument, which clips folds of skin closed after operations. Designing the stapler would have required about three to six extra months had Ethicon used its previous CAD/CAM gear without the three-dimensional solid modeling capability, Biehl said.

Prior to installing a beta-test version of CADDS-5 in February, Ethicon used CADDS-4. However, that package lacked the ability to do complex 3-D solid modeling, called parametric modeling, so Biehl had to supplement it with Parametric Technology Corp.'s Pro/Engineer.

Jockeying between the two applications was too time-consuming and bulky, according to Ben Howard, manager of engineering resources. Ethicon's heated race with archrival United States Surgical Corp. is being felt across the company, Howard said. "We had to cut our decision time and, therefore, our development time," he said.

When Computervision added parametric functions and an improved user interface to its CADDS line, "it was natural for us to become a completely CADDS shop," Biehl said.

Ethicon, which has designed with Computervision software since 1986, recently signed a $5.5 million contract for more CADDS products.

Ethicon is now wrapping up installation of 130 CADDS seats, scheduled for completion before January.

Late off the mark

Computervision, which released CADDS-5 in June, was late off the parametric mark, according to Gisela Wilson, a CAD/CAM analyst at market research firm International Data Corp. in Framingham, Mass.

The fact that Computervision offered scant 3-D capabilities, which were already available from Parametric Technology, Intergraph Corp. and Structural Dynamics Research Corp., among others, "hurt [Computervision's] sales and its claim of technology leadership in CAD/CAM," Wilson said.

Although she is enthusiastic about the new product, Wilson said she does not expect revenue from it to boost the bottom line of Prime Computer, Computervision's parent company, until halfway into 1992. That's mainly because of the gradual rollout schedule for CADDS-5.

The entire suite is priced at $24,500. When purchased separately, the tools range in price from $895 to $12,500 per module, depending on platform.

KIM S. NASH

NETWORK SHORTS

E1 access available

Alternative local telecommunications carrier **Metropolitan Fiber Systems, Inc.** (MFS) recently announced an E1 access service it is making available to companies located in MFS' 12 U.S. service areas. The service targets international companies requiring E1 delivery service locally in the U.S., according to the company. E1 is the European version of the U.S. T1 standard.

Northern Telecom, Inc. is expanding further into Asia with a Tokyo laboratory that will develop telecommunications products tailored to Asian needs. The lab will be part of **Bell-Northern Research**, a Northern Telecom subsidiary. It will work with Asian firms to incorporate and take advantage of technologies used in the region.

Electronic mail from both public and private networks will be brought to portable personal computers over wireless links as part of an alliance between **Ericsson GE Mobile Data, Inc., Research in Motion** and **Anterior Technology, Inc.** Anterior, based in Menlo Park, Calif., will provide its Radiomail gateway between Paramus, N.J.-based Ericsson's Mobitex public mobile data network and other E-mail systems.

Pathworks beats out Netware — barely

ON SITE

BY ELISABETH HORWITT
CW STAFF

MALVERN, Pa. — Faced with the choice between Digital Equipment Corp.'s Pathworks and Novell, Inc.'s Netware as its companywide network operating system, Smith Industries Corp. chose Pathworks.

However, the aerospace company still has some reservations about DEC's VAX-based local-area network server strategy, according to Steve Ruger, information systems manager at the company's Smith Industries Ltd. division.

In particular, Smith Industries would like to implement a distributed departmental LAN server strategy without having to implement "a Microvax in each office," Ruger said.

Two years ago, the firm had eight personal computers and 10 Apple Computer, Inc. Macintoshes on its Netware LAN. Six months later, that number had grown to about 65 PCs, 25 Macintoshes and a few DEC Ultrix workstations, Ruger said.

Users were already accessing corporate files and applications on a DEC VAX, so the company came to see its Netware server as "yet one more system to maintain," Ruger said.

The firm began looking for a network operating system to turn that VAX into a combination corporate host, LAN server and gateway to Smith's X.25 packet-switched network. One major reason the company rejected Novell's Netware-for-VMS product was that it grew tired of waiting for Novell to introduce Macintosh support, Ruger said. "I've come to the conclusion that Novell's commitment to Netware on VMS is tepid at best," he added.

Smith Industries beta-tested Pathworks' predecessor, DEC's Personal Computing Systems Architecture, and found it "terrible on the first pass," Ruger said, although he added that "the new one was fine."

After testing Pathworks' Macintosh support for over a year, the firm went on to implement the product across its 200-person organization.

Continued on page 62

USERS WERE ACCESSING corporate files and applications on a DEC VAX, so the company saw its Netware server as just another system to maintain.

Nets the smart choice for Wolverines

BY MICHAEL FITZGERALD
CW STAFF

ANN ARBOR, Mich. — When the University of Michigan's 322-pound All-American tackle Greg Skrepenak heads to the weight room, his first stop is the personal computer. The same system has a handle on Heisman Trophy winner Desmond Howard and hundreds of other Michigan athletes.

Although many of the users are huge athletes like Skrepenak, who can leg press 550 pounds 50 times, the PCs used in the weight room are puny even by today's standards.

"We just use a souped-up AT," shrugs Andrew Godsick, a sports management graduate student who coordinates most of the athletic department's PC use.

The IBM PC/AT acts as a server running Novell, Inc.'s Netware 2.11 and connects to five diskless ATs via Ethernet.

Michigan's training room uses a 10Base-T network that connects five PCs: an IBM Personal System/2 L40SX laptop, a PS/2 55SX, an XT, an AT and one Packard Bell Electronics, Inc. AT-compatible.

The server is an IBM PS/2 Model 80 A31 with Novell's Netware 386 and will support four more PCs, a 55SX and three Packard Bell clones, after the department installs a fiber-optic network in 1992. Both servers contain extensive statistical information on the athletes.

Meeting workout goals

In the strength and conditioning rooms, each athlete is assigned a workout, which is carefully tracked by graduate assistants, who plug the information into a program that calculates how well they met their goals. The training room tracks the progress of injured athletes and gives treatment schedules.

Godsick says the athletic department's business office just replaced an AT file server with Model 80, a system with 8M bytes of random-access memory and a 320M-byte hard drive, to run a Banyan Systems, Inc. Vines network. The network has four PCs running custom-built software from Ann Arbor's Baseview Products.

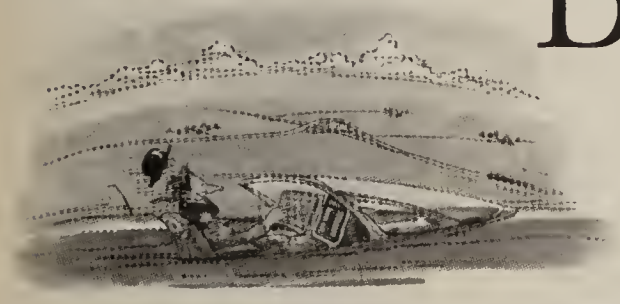
Do not expect Wolverine head coach Gary Moeller to plan his Rose Bowl strategy on the PC. The football team uses a simple tracking system in its recruiting, but that is about as far as it goes.

"They have a program called Playmaker to do play diagrams, but most coaches don't use it," Godsick said. "They're into handwriting. It's their loss."

Given Michigan's 2-8 record in the Rose Bowl since 1970, Godsick could be more right than he knows.

Bob Kalmbach

Heisman Trophy winner Desmond Howard *benefits from PC-based training*



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Token Ring product ready

Cabletron's management module to allow traffic analysis, port control

BY JOANIE M. WEXLER
CW STAFF

ROCHESTER, N.H. — Cabletron Systems, Inc. last week started shipping a Token Ring management module for its smart wiring hub that gives users extra layers of insight into their Token Ring networks.

The move could affect the 35,000 Token Ring hub ports the vendor said it has shipped since it announced Token Ring support in September 1990.

The object-oriented Token Ring Management Module operates with Simple Network Management Protocol-based management packages, including Cabletron's own Remote Lanview and Spectrum offerings. It provides more network information to help users better analyze traffic patterns, manage bandwidth and control each individual Token Ring port wired through Cabletron's intelligent hub.

For example, users can calculate the percentage of bandwidth use on any given local-area network or individual workstation, said Tedd Frechette, Cabletron's Token Ring product manager. He also said the module maps a workstation hardware address to the hub module port, so that a network manager seeing errors on a given node knows which port to shut down.

This "helps us narrow problems down very quickly," said Graham Morrison, project leader of LAN services at Blue Cross/Blue Shield of Connecticut in North Haven. The insurance company has been beta-testing the enhanced management module since August.

Morrison said the package allows the firm to load in blueprints of its 1 million-sq-ft facility — which he expects to double in size — to get "granularity down to the node. When we do have to send someone out on the floor, we're able to show them exactly where to go and which closet the device terminates into."

Morrison said he would like to see more features added, including analyses of which nodes communicate with each other "to aid in building bridging tables." He added that while Cabletron's hub supports the management of both Ethernet and Token Ring networks, the management is not yet integrated.

Cabletron's $4,995 hub module kicks off a series of expected Cabletron management product announcements to leverage the power of reduced instruction set computing (RISC). The Intel Corp. I960 RISC chip "is faster than what competing hub vendors are using on their products," observed Charlie Robbins, director of communications research at the Aberdeen Group, a Boston consultancy.

According to Frechette, there is untapped potential in the 32-bit, 25-MHz processor that he said "will allow us to add future enhancements."

Pathworks beats out Netware — barely

CONTINUED FROM PAGE 61

The VAX host running Pathworks acts as a file server for all PCs and Macintoshes and backs up all LAN files overnight. The VMS' built-in security system provides better control of file access than the Novell system, according to Ruger.

However, one problem is that Pathworks takes up a lot of PC memory, which leaves insufficient room for some applications — particularly on PCs that are also running Microsoft Corp.'s Windows, Ruger said. Another glitch is that printer services continue to stall "at least once a day" because of print queue problems, he added.

One of Ruger's biggest gripes about Pathworks is that DEC still does not have adequate third-party support in place. "Consultants we talk to flash their Novell certification but don't even know what Pathworks is," he said. A DEC spokesman said the firm is expanding its third-party value-added reseller network.

Ruger is also impatient for a DEC Ultrix version of VAX/VMS services — particularly those that allow electronic mail and file-sharing among users on distributed LANs. DEC's current Ultrix Pathworks product supports only local LANs, a DEC spokesman said.

Ruger also balked at DEC's suggestion that he buy either its VAX-based All-In-1 office-automation system or a separate X.400 E-mail system to support E-mail exchange across PC LANs. Both products are too costly, he said.

Ruger is now evaluating PC LAN-based E-mail systems such as Lotus Development Corp.'s CC:Mail and Microsoft Mail. "We can probably use PCs as E-mail servers for $3,000 or $4,000," Ruger said.

Unisys adds SNA capabilities to CTOS workstations

BY ELLIS BOOKER
CW STAFF

BLUE BELL, Pa. — Continuing its strategy of being "bluer than blue" when it comes to support for IBM's Systems Network Architecture (SNA), Unisys Corp. earlier this month introduced a suite of new SNA products for its CTOS-based commercial workstation line.

CTOS, an integrated, multitasking message-based operating system, was created by Convergent Technologies, Inc., which Unisys acquired in 1988.

Among the dozen new elements in the CTOS Client/Server SNA product suite are facilities for exchanging electronic mail with IBM's host-based office automation systems, as well as a service for managing remote workstations with IBM's own host-based Netview network management system.

According to Unisys, well over half of the 1 million-plus CTOS workstations shipped by all vendors to date are connected to IBM mainframes. For its own CTOS sales, Unisys claims the proportion of IBM accounts is even higher — about 80%.

The products introduced earlier this month include the following:

- CTOS OFIS Access Professional 1.0 links CTOS OFIS mail and IBM's host-based Professional Office System. A second product, CTOS OFIS Access SNADS 1.0, offers the same connectivity to IBM's latest generation of mainframe-based office automation systems, Officevision/MVS, as well as Application System/400 systems running Officevision/400.

Other software products enable CTOS systems to exchange mail with IBM Disoss and mail systems based on Unix Simple Mail Transfer Protocol and X.400.

- CTOS SNA/NM Entry Point Services 1.0 allows CTOS LANs to be managed from an IBM host under Netview. CTOS SNA/NM Distribution Manager 1.0 uses the capabilities of Netview's own Distribution Manager (Netview/DM).

A third element, CTOS SNA Distribution Services (SNADS) 1.0, implements IBM's own SNADS architecture, extending SNA network store-and-forward capability to a CTOS network.

As a statement of direction, Unisys stated its intent to support IBM's Systems Application Architecture Common Programming Interface-Communications and to extend support for IBM's Advanced Peer-to-Peer Networking architecture.

All the products, with the exception of CTOS SNA/NM Distribution Manager, are available immediately. The Distribution Manager will be available in June 1992.

According to Unisys, well over half of the CTOS workstations shipped by all vendors to date are connected to IBM mainframes.

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MANAGEMENT SHORTS

EDIers honored

Sears, Roebuck and Co., Wal-Mart Stores, Inc. and Consolidated Freight, Inc. won worldwide electronic data interchange (EDI) leadership awards earlier this month from "EDI, spread the word!" a Dallas-based clearinghouse for the EDI industry. Sears was honored for the fastest implementation of an EDI program during the past six months. Consolidated Freight was cited for having the highest number of EDI trading partners, and Wal-Mart earned its award for the highest number of trading partners as suppliers.

The Electronic Data Interchange Association (EDIA) has issued a call for speakers for its 24th annual EDI Users Conference & Exhibit, slated to be held Dec. 9-11, 1992 in Nashville. Those interested should contact William R. Myers, EDIA conference chairman, Suite 550, 225 Reinekers Lane, Alexandria, Va. 22314; telephone (703) 838-8042. The deadline is March 31.

Information technology use is growing rapidly in the practice of public relations, according to a membership survey conducted by the New York-based **Public Relations Society of America.** Among 205 society members responding to the survey, 93% said they use personal computers, 46% use electronic database services, and 45% use electronic mail.

"International Information Systems," a new journal devoted to global issues in information systems management, has been published this month by HBJ Professional Publishing, a division of Harcourt Brace Jovanovich, Inc. Articles in the first issue cover topics such as EDI in international contracting and IS policies in Europe.

It all adds up for Young & Rubicam

Ad agency wisely held off on IS investments until technology addressed its needs

BY SALLY CUSACK
CW STAFF

Sometimes it's better to have nothing than something.

At least that was the case for Young & Rubicam, Inc., one of the world's largest advertising agencies. While many state-of-the-art information systems shops are struggling with standards implementation and downsizing dilemmas, New York-based Young & Rubicam says it may have a head start on computing in the 1990s because it held back on major technology initiatives until the mid-1980s.

"Transaction processing doesn't handle what our businesses are really about," says Nicholas Rudd, senior vice president and chief information officer. "We are about combining the various products we make with very personal client relationships."

Young & Rubicam was actually a high-tech pioneer in the back office, installing a Burroughs Corp. mainframe some 30 years ago to handle number-crunching, bills, invoicing and the like. But it wasn't until the mid-1980s that systems could really be applied to the true nature of Young & Rubicam's business. The introduction of personal computers and front-office architecture was the company's watershed for implementing truly meaningful work enhancement techniques via computers.

Claudio Edinger

Young & Rubicam's Rudd *says networked workstations will bring full computer literacy to the advertising agency*

Today, the privately held, $7.5 billion agency is forging ahead toward an ambitious goal of 10,000 internetworked workstations worldwide by 1995, linked together via frame-relay products.

Given the global nature of the organization, it was imperative that any IS undertaking be shaped with an eye toward international needs. Young & Rubicam employs 12,000 people worldwide, and billings are split evenly between the U.S. and overseas operations.

So in 1985, Howard Maynard, a 23-year IS veteran and former director of information services at Exxon Corp.'s short-lived office systems business, joined Young & Rubicam as director of MIS.

"I was brought in to give an international perspective," Maynard says. "We were spending a lot of money to run a data center, and people weren't happy."

Maynard and his staff made a decision that turned out to be ahead of its time. They outsourced both the development and processing of their back-office mainframe applications to Donovan Data Systems, a New York-based vendor specializing in outsourcing for the advertising industry. Outsourcing helped clear the way for Young & Rubicam to concentrate solely on ways to leverage technology specific to its five business divisions: advertising, public relations, direct marketing,

Continued on page 64

New user group ponders outsourcing question

BY CLINTON WILDER
CW STAFF

Wherever a new technology or management trend is going, the birth of a user group will surely follow. So it is no surprise that the first multi-industry user group has been formed for companies that have outsourced part of their information systems function — or are thinking about it.

The Vendor Partnership and Outsourcing Interests Group, based in Sherman Oaks, Calif., is the brainchild of two veteran Southern California IS consultants, Gene Sheiniuk and Barry Wiegler. Sheiniuk and Wiegler, founders of Key Consulting Group, Inc., also in Sherman Oaks, have teamed up with IS management heavyweight DuWayne Peterson to co-sponsor the user group. Peterson, the recently retired chief information officer at Merrill Lynch & Co., is now an independent consultant in Pasadena, Calif.

The group has four corporate members so far. Membership is $15,000 per year, which buys two conferences per year, research studies and networking opportunities with other companies that have undergone the outsourcing experience.

In the same room

"We will get people who haven't [outsourced] in the same room with those who have, and they can at least find out what they shouldn't do," Sheiniuk said.

Among the possible outsourcing issues to be covered are the areas of greatest potential payoff by outsourcing, potential obstacles and trouble spots, experiences with specific vendors and all-important contract issues. "We want the group to be the catalyst that helps members help each other," Wiegler said.

Outsourcing vendors are not eligible for membership but will be invited to give presentations. The group's sponsors do not want members deluged with vendor sales pitches, however; members' names are kept confidential because "they don't need more vendors beating down their doors," Wiegler said.

Wiegler and Sheiniuk formed Key Consulting in 1983 after long careers in consulting and IS management. Wiegler managed systems development at Security Pacific Corp. in the 1960s; Sheiniuk is a former IS chief at Imperial Bank.

The $15,000 membership fee "is not insignificant," Wiegler said, "but companies can spend many times that with a consulting firm deciding whether or not to outsource."

Member companies can designate two representatives. In most cases, that would be the CIO or equivalent and another manager in IS, although the group encourages participation by chief financial officers and business executives. The group's first meeting is tentatively scheduled for March 1992.

It all adds up for Young & Rubicam

CONTINUED FROM PAGE 63

sales promotion, sales advertising and design and corporate identity management.

"The other half of my assignment was to focus on front-office applications that would be viable to *our* business," Maynard says.

Rudd and Maynard have worked closely together to integrate strategic planning for the firm, articulating strategies for both technology and management of information as applied to the business.

As an example, Young & Rubicam's Direct Marketing Division can do the equivalent of point-of-sale data collection in television advertising, along with preparing commercials.

With a magazine client, the agency prepares a television commercial — with an 800 number for subscriptions — to run on various channels at specified times. Phone calls start coming into the telemarketing agency, which operates 24 hours a day to accommodate different time zones.

Young & Rubicam has now implemented technology that allows tracking data to show up on the account executive's desk the next day. This would include information such as when the greatest number of calls were placed and the demographics and number of orders placed.

Using this type of information, an account executive can fine-tune the process if necessary and immediately correct any situation.

Given the highly flexible and fluid nature of the business, Rudd stresses the importance of providing each business unit with technology that meets its individual needs.

For example, Young & Rubicam's design company relies heavily on Apple Computer, Inc. Macintoshes, while the public relations end of the business — Burson Marsteller — has been functioning as a worldwide network using Digital Equipment Corp.'s Decnet architecture. There is a wide variety of desktop equipment used by the advertising division.

And while diversity and freethinking is encouraged, it is important that the units work together as partners when it is in a client's benefit to do so, Rudd says, pointing out that major clients often use more than one of Young & Rubicam's services.

Hence the company's mission to establish a single worldwide network link among all of its desktop systems.

At present, the divisions rely primarily on fax machines to transmit messages and material across boundaries and oceans. The company uses multiprotocol routers for linkups in the U.S., and Integrated Services Digital Network dial-up digital technology in Europe.

Global frame relay

"We will be experimenting with frame relay here in the U.S. next, and we will eventually offer it on a global basis," Maynard says. The goal of the new environment is to allow people to perform loosely structured, very flexible tasks.

Maynard says that since the company has not been "hobbled" by an installed base of older technology, it can go directly to the new computing paradigm of versatile desktop environments and open network architecture.

The biggest change, however, is going to be in how people will work when free to use computing, Rudd says. In 1985, only 10% of the company was exposed to computers. Today, that has grown to between 30% and 40%, and by 1995, all employees are expected to be computer-literate.

"We are designing and engineering cultural changes that will allow our professional services people to take advantage of technology," Rudd says. "We have to help Young & Rubicam become a learning company."

Company snapshot

Founded in 1923 and based in New York, Young & Rubicam employs 12,000 people in 299 offices in 52 countries.

In 1990, worldwide billings were $7.5 billion, and gross income topped the $1 billion mark for the privately held company.

The firm has five main operating divisions:

- Young & Rubicam Advertising.
- Burson-Marsteller (public relations).
- Wunderman Worldwide (direct marketing).
- Cato Johnson (sales promotion).
- Landor Associates (design and corporate identity management).

Chairman and CEO: Alexander Kroll
President: Peter A. Georgescu
Chief information officer: Nicholas Rudd
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INTERNATIONAL BRIEFS

Pacific overtures

▶ Knowing how to do business in the Pacific regions may be a must in years to come, and **Apple Computer, Inc.** is not leaving anything to chance. In mid-January, the firm will host its third annual forum aimed at teaching Macintosh developers how to enter the critical strategic market. Antipiracy, distribution issues and local partnering will be discussed as Apple focuses on five regions: **Japan**, the **Far East**, **Canada**, **Australia** and **Latin America**.

Subscriber drive

▶ Spain's state-controlled **Telefonica de Espana SA** will invest $285 million next year to develop its mobile telephone systems, which account for an estimated 80% of the country's mobile phone market, the firm said. The carrier expects to see its year-end subscriber tally at 110,000 — up from 100,000 at the year's start. Projections are for 210,000 users by the end of 1992.

Heading south

▶ **Bachman Information Systems, Inc.** is off and running in a new direction: south of the border. Choosing as its new allies three companies with proven clout in selling and supporting **IBM** products that complement Bachman's software offerings, the Burlington, Mass.-based firm signed distributorship agreements in **Argentina**, **Mexico** and **Venezuela**.

West meets west

▶ Munich, Germany-based **Siemens/Nixdorf Informationssysteme AG** last week chose Santa Clara, Calif.-based Tandem Computers, Inc. subsidiary **Ungermann-Bass, Inc.** as its major local-area networking OEM partner. Officials at both firms said Ungermann-Bass rode to victory over some 36 companies contending for the contract on the technological strength of its switching-based hub architecture.

On the rise

▶ According to market forecasts by computer experts in **China**, the mainland computer market is expected to grow steadily during the **Eighth Five-Year Plan** (1991 to 1995). Total demand for computers during this period is expected to exceed 10,000 units.

Firms take tips from high-tech testing

BY KIM S. NASH
CW STAFF

BOSTON — Nearly four years after starting a software company in Cambridge, Mass., Jeff Peoples and his two partners are beginning to see their product take off. The software is shipping out, Peoples said, because the company is shaping up, thanks to an unsparing diagnostic technique taught to it by a consulting arm of Coopers & Lybrand.

In 1988, the trio, programmers at heart and by trade, lifted the curtain on Window Book, Inc., a firm that publishes on-line reference manuals, bibles and other lengthy books for individuals and corporations. While it does a nice business, the company hasn't gone gangbusters, according to Peoples.

"We were ignoring some aspects of business, like marketing, and concentrating too much on what we know: techie stuff. The company wasn't balanced," he said.

That started changing seven months ago, after Window Book underwent an eye-opening self-examination led by the National High Tech Group, a group within Coopers & Lybrand based here.

Cheryl Suchors, a partner who controls daily operations at the 8-year-old group, stepped Window Book founders through a series of several hundred questions designed to uncover areas that presented the biggest risks to the young company.

How am I doing?

Top execs could benefit by asking questions like these, says the National High Tech Group — starting with the man (or woman) in the mirror

Stage (average age of company)	**Questions to ask**
Concept (1 day - 12 months)	Have we sketched out a simple product development plan, with resources and a loose timetable?
Seed (3 months - 12 months)	Have we mapped out a detailed schedule, listing milestones and resources for monetary and technology support?
Product development (12 months - 48 months)	Does the product development plan address each part of the design, with focused plans for software, hardware, physical appearance design, diagnostics, documentation, quality control and customer support?
Market development (24 months - 48 months)	Is the formal plan, stating priorities for subsequent enhancements, new releases and the next product, developed and approved by all departments?

Source: National High Tech Group

CW Chart: Janell Genovese

Her finding: Window Book was lopsided. While product development was solid, selling techniques were immature. Suchors said she sees this dynamic often in technology start-ups. "It's not hard to fix, but it can be hard to recognize," she said. Since 1990, Suchors' group has evaluated 30 ventures in the U.S.

Taking measures

The process it uses is based on the Bell/Mason Diagnostic, a 700-question method for measuring risk and predicting growth of emerging technology companies. Coopers licensed the diagnostic last year from its inventors — Gordon Bell, an industry notable with 30-plus years in the technology business, and Heidi Mason, a former marketing strategist at Digital Equipment Corp.

Bell also sold the method to his alma mater, DEC, where he worked for 23 years. DEC is using it to assess potential firms in which to invest.

The diagnostic evaluates 12 dimensions of a start-up, such as cash situation, management team and viability of product (see chart page 66). Depending on the health of these dozen areas, a young company can be in one of the following four stages:

- **Concept:** Founders lay down the logic of their idea and sketch a business plan.
- **Seed:** With detailed product specifications and a fleshed-out

Continued on page 66

Welcome to New Blue: Execs address restructuring

BY NELL MARGOLIS
CW STAFF

NEW YORK — IBM's executive committee took to the podium at an analysts' briefing earlier this month to practice what may be its stock in trade for a long time to come: imparting information and answering questions about the reorganization.

In fact, their morning-long presentation performed two functions, serving not only as a briefing but also as a trial run for IBM's avowed New Openness.

"I was surprised and impressed by their candor," said Ulric Weil, president of Weil & Associates, a consulting firm based in Washington, D.C. However, he noted, reaction following the conference focused — unsurprisingly — on the grim economic realities imparted by the top IBM executives, rather than on the unprecedented amount of frankness on their parts that allowed analysts to walk away with such a barrage of disconcerting information.

During the conference, several members of the executive committee had the following to say on several of the key issues concerning industry observers:

- **On entering new business arenas:**

"We're moving aggressively into the original equipment manufacturer's marketplace . . . The OEM market offers $100 billion in business opportunities. We intend to grow our OEM business to about $3 billion in 1993.

"If we're going to gain market share, some of where we're going to have to do this is in the OEM market, and this means taking on the large Japanese companies, who aren't used to running into IBM at customer sites but will become so." — Chairman John Akers.

"Our goals for [reduced instruction set] technology are not confined to the 'computer' industry. RISC may very well find uses in some unexpected areas. Consumer electronics, for example, is not out of the question." — President Jack Kuehler

- **On financial disclosure by the newly autonomous IBM units:**

"We will report [the units' respective financial results] beginning with our 1991 annual report, with our financing business and federal systems business results at a minimum . . . As soon as we can, we will begin to publish the results of other segments, and we will be doing that on a more than once-a-year basis." — Senior Vice President Frank Metz

- **On the coming change in large systems pricing:**

"In the past, IBM hardware prices included many support services because customers wanted them. Well, the market has changed . . . We have set very competitive prices for our new technology systems, and we are rapidly moving to a fee services business where if customers want services — contract programming, education, consulting, etc. — they will pay a fair price for them." — Senior Vice President Terry Lautenbach

- **On role of alliances:**

"Simply stated, alliances are fundamental to delivering solutions to our customers and growing our revenue." — Senior Vice President C. Michael Armstrong

- **On the traditional "no-layoffs" stance:**

"Employment security, over time, will become the responsibility of our new business general managers." — Akers

- **On whether IBM will look beyond its own borders for talent to fill top positions at new units:**

- "Yes, we're considering it — and aggressively." — Akers

- **On how long the ambitious turnaround will take:**

"That's the key question. Some people will take to what we're doing and will be aggressive. Others will not; we'll have to do something about that, and we're not afraid to — that's one of the differences between the old and the new IBM." — Akers

Firms take tips from high-tech testing

CONTINUED FROM PAGE 65

business plan in hand, founders seek capital from outside investors.

• **Product development:** Development team is hired; members test specifications and build alpha- and beta-test product versions.

• **Market development:** Firm ships product to primary target markets and focuses on breaking into secondary sectors.

In a daylong question and answer session, executives identify the strong areas and the areas where the company may be falling down. "You get a view of where your company is right now, measured against an ideal," Suchors said. That's a good idea, considering how an angry recession is ripping into U.S. business.

High-tech companies could be particularly vulnerable to economic slowdowns. Business failures in California and New England, traditional technology hot spots, have climbed sharply. The New England region posted the biggest regional increase in business failures for the period — up 82% from about 1,700 in 1990 to 3,100 in 1991, while the Golden State shot up 71% from 4,800 to 8,200, according to The Dun & Bradstreet Corp.

Overfunding is one mistake fledgling firms make, according to Bell. Entrepreneurs get excited about an idea, then pour money into it without devising the tight business plans required in the seed stage, he said.

Other companies can't decide whether they're researchers or product makers, he added — which is a fate Kurzweil Applied Intelligence, Inc. hopes to escape. The 9-year-old Waltham, Mass.-based maker of speech recognition gear signed up for the diagnostic in April, just after booking its first-ever profitable quarter.

Kurzweil was primarily a research and development firm until 1985, when it launched its first commercial product. Bernie Bradstreet, president and chief executive officer, described the growth since then as "steady, but we felt we could do more. Plus, we wanted to prepare for the next stage of maturity."

Like those at Window Book, executives at Kurzweil were initially skeptical about whether they would see a return on investment with the diagnostic. Price and length of the process vary, depending on the stage a company is in. Typically, Coopers charges less than $5,000 for what amounts to a week of examination, including the on-site sessions.

What Bradstreet discovered confirmed his suspicions. Although the company is in the late "market development" phase — experiencing steady growth and profitability — Kurzweil needed to hone communications between the product engineering and marketing departments.

"It helps to have these ideas reinforced," Bradstreet said.

Indeed, those executives interviewed said one of the strengths of the Bell/Mason method is the aerial view it captures. In regular internal meetings, management often reacts to current events, Bradstreet said, but the diagnostic reveals whether the processes a company has instituted are effective.

Wheel of fortune

Young firms in one of four growth stages are judged in 12 business areas vs. an ideal model

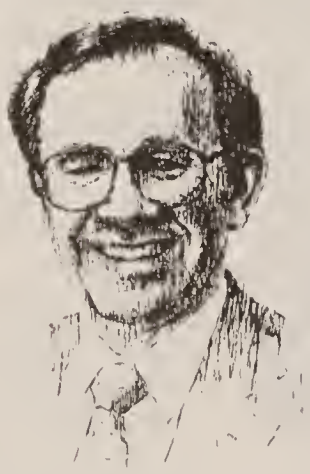
Source: National High Tech Group

CW Chart: Janell Genovese

GE outsources desktop to EDS

DALLAS — Outsourcing player Electronic Data Systems Corp. and $58 billion General Electric Co. last week sealed an agreement under which EDS will procure, provide and maintain the technology on GE desktops around the world.

The newly minted GE/EDS Desktop Computing Program — financial details of which were not disclosed — will aim to imbue GE's stable of PCs, peripherals and related services with improved response time, service, quality, productivity, financial control and flexibility, according to an EDS spokesman. EDS Technical Products Division President Robert Neighbors praised GE's effort to bring "a strong measure of control and predictability to their PC environment."



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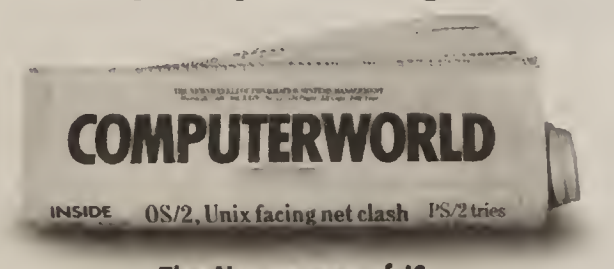


The Newspaper of IS

High achievers retrace their steps

BY JILL VITIELLO
SPECIAL TO CW

When Bill Osl reluctantly took a promotion into the pioneer Consumer Product Business Unit at AT&T in 1983, he had no idea that this "frustrating, painful experience" would turn into a pivotal career move for him. Yet in hindsight, Osl, who is now vice president and division executive of information management services at AT&T, says the skills he acquired in the course of performing a job he neither wanted nor enjoyed were key to his success at the company.

Osl and eight other top information systems executives agreed to talk about some of the significant turning points in their careers and lessons they have picked up along the way, in the hope that their experiences may provide some helpful insights for others in the field.

Personal stats:
- Richard Koeller
- Vice president, information technology
- Whirlpool Corp.
- 29 years in IS field; 2½ years at company
- Bachelor's degree in finance

Turning point: Back in the dark ages of computers in 1961, I was working in a steel mill. Out of intellectual curiosity, I wrote a math model that would provide full process control of an $80 million steel-rolling mill. I figured I knew more about rolling steel than the programming consultants, and as it turned out, I was right. The company used my program, not the consultants'. That became a turning point in my career. A high-level manager took an interest in my programming work and before I knew it, I was in the information technology field, where I've stayed ever since.

Difficult passages: Making the transitions from individual to manager to officer is not easy. I compare CIOs to 19th-century sheriffs. Society let us do our own thing while the frontier was new. Now they're asking us to put down our guns and run for mayor. It's a difficult step, yet it's necessary if information technology is to grow as it should and re-engineer business.

Personal stats:
- Elaine Bond
- Senior vice president and senior consultant, IS area
- The Chase Manhattan Bank NA
- 35 years in IS; 11 years at company
- Bachelor's degree in mathematics

Turning point: Two back-to-back assignments at IBM were instrumental in my career. First, I ran a research and development group in which I had the opportunity to run my operation as if it were my own company. Then, I was asked to become the head of executive resources, reporting to the chairman. In this role, I had the chance to learn the company from the very top of the organization.

Difficult passages: The worst time in my career is what I call a "dead spot." I was doing a job I enjoyed with a fun group of people, but I was not in the heartbeat of the company. When I realized I was comfortable but not growing, I left that job. Sure enough, the area was phased out because the work no longer fit corporate needs.

Personal stats:
- David M. Carlson
- Senior vice president, corporate information systems
- Kmart Corp.
- 30 years in IS; 6½ years at company
- Doctorate in engineering

Turning point: Garret Morris, an actor who was on the show "Saturday Night Live," used to imitate a baseball player whose trademark slogan was: "Baseball's been very, very good to me."

Well, computers have been very, very good to me.

The first computer I programmed was a vacuum tube computer back in 1959 at the University of Michigan. Now, the technology that took up an entire room exists on the corner of one small chip.

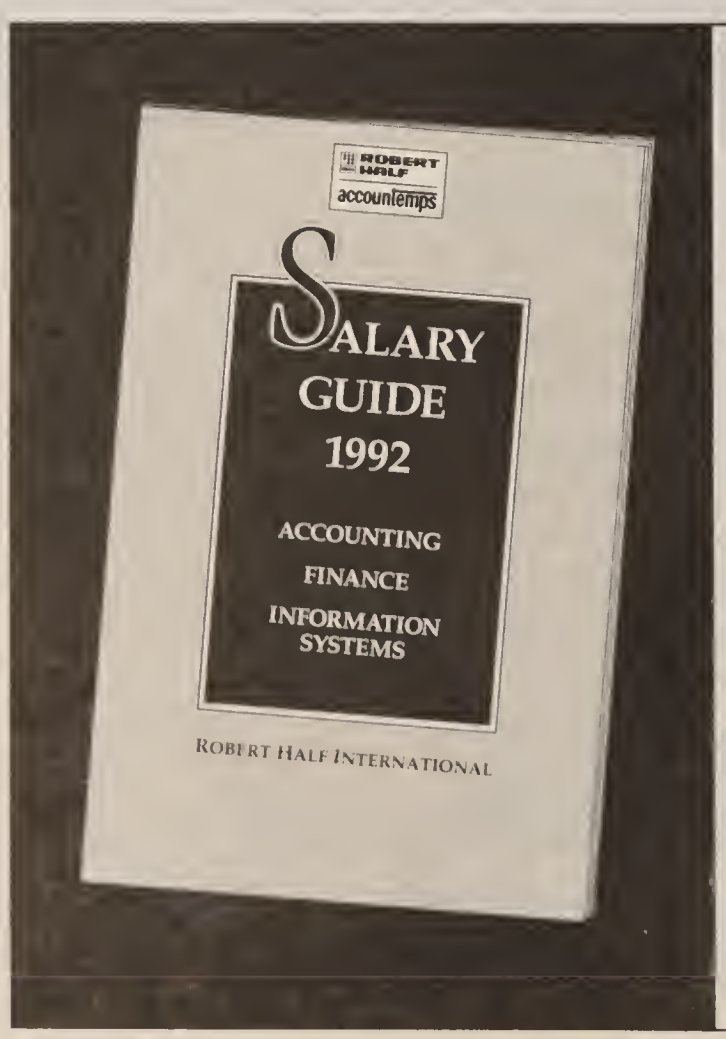
Without a doubt, the best move I made was in coming to Kmart. I joined at a time when the company was launching the largest retail automation program in the world with a commitment of more than $1 billion.

It was a revolutionary technological change in support of customer service, and I was lucky enough to be one of the architects of that change.

Lessons learned: I've learned the value of a liberal arts education. While I was a graduate student in engineering, I taught undergraduate psychology, having been prepared by many semesters of undergraduate work in that field.

This background has provided models for the behavior of individuals, groups and organizations that have helped me learn to manage people and departments and contribute to the management of corporations.

Vitiello is a speech writer and free-lance writer based in East Brunswick, N.J.



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Personal stats:
- Michael Simmons
- Group executive, technology and operations
- Bank of Boston
- 32 years in IS field; two years at company
- Postgraduate work following bachelor's degree

Turning point: My most pivotal career move was when I decided to leave the education field and go into data processing.

I loved my work as a high school biology teacher, but I wanted a career with more competition and the chance to earn more money. So I left teaching, took a cut in pay and went to work for a data processing company.

Lessons learned: The worst mistake anyone can make is to chase titles and rainbows. I don't believe you can plan your career; you've got to be open to opportunities as they arise. Three of the jobs I held didn't exist 90 days before I accepted them. And I've taken jobs at less pay and lower status when I saw that they would offer a chance to increase my technical knowledge.

Personal stats:
- William R. Clabby
- Senior vice president of information services
- Dow Jones & Co.
- 18 years in IS; 37 years at company
- Bachelor's degree in journalism; minors in political science and English

Turning point: When I graduated from college, I had three offers for entry-level reporting jobs; I took the one that paid the least but was with the most exciting company — Dow Jones. Eventually, I worked my way up to become New York City bureau chief, a job I held for seven years.

Then one Friday afternoon around 4:00, the managing editor came in and asked me if I'd like to take over the wire operation on Monday morning. Dow Jones was just beginning to get into electronic information retrieval at that time.

If I'd had more than a weekend to consider the job offer, I probably would have turned it down. It turned out to be a hell of a move. The business just exploded, and my career grew with it.

Lessons learned: If I've made any mistakes along the way, it would have to be in not learning a foreign language. I never dreamed I'd be involved in international work, but now I am.

Personal stats:
- Patricia C. "Tosh" Barron
- Vice president, corporate information management
- Xerox Corp.
- Four years in IS; 13 years at company
- MBA

Turning point: Each career move I've made has helped me build a cross-functional perspective that's been valuable in all my assignments. I have a marketing and international background, but Xerox was my first job in the information systems field. Here, I've learned the importance of managing information, a fact other managers without IS experience have yet to comprehend.

Difficult passages: I began my career in consulting straight out of Harvard's MBA program. Looking back, I can see that I went into consulting far too early in my career. At that stage, one has no grasp of the nuances of business or the intangible factors that successfully create and manage change.

Personal stats:
- Dean O. Allen
- Corporate vice president, information and administrative services
- Lockheed Corp.
- 28 years in IS; six years at company
- Master's degree in finance

Turning point: My most critical career move was actually a detour out of the information technology field. To prove an IS professional could operate at a high level of competence outside the industry, I spent about five years in charge of financial planning and investment analysis for a major corporation. That's where I learned to appreciate the complexity of business, getting actively involved in aspects of the overall enterprise that I'd only had the chance to observe while I was in information technology. When I returned to IS, I brought with me a better understanding of business needs.

Lessons learned: From that experience, I saw that building a career in information technology has its hazards. If you want to become the president of the company, you don't spend a lot of time in IS.

I'd tell college students and graduates to think hard about careers in information technology because of the limited long-term growth into management-level positions.

Personal stats:
- Raymond S. Perry
- Vice president and chief information officer
- Avon Products, Inc.
- 30 years in IS; five years at company
- Master's degree in engineering

Turning point: As a student at Cornell University, I was not a good or happy engineer, but I was fascinated with industrial engineering. That's where I was exposed to computing. Back then, you could learn in two semesters all there was to know about computers. I was hooked. I became a systems analyst in 1961, and 30 years later it turns out to have been an incredibly wise decision. I've had the opportunity to do more exciting and fun things than I would have as a mechanical engineer.

Lessons learned: I've learned the worst thing anyone can do is stay in one place too long. About 12 or 15 years ago, I was having almost too much fun. I had settled into a comfortable job and was managing a good staff which bore a full project load. I looked forward to 20 years there with no change and hoped to retire from that position. But I found out the world won't hold still for you.

Things began to change around me, and I decided to make a major move. I became a member of the University of Michigan business school faculty and revitalized myself professionally. It was an exciting change, and I loved the place. I regained my perspective and went back into industry.

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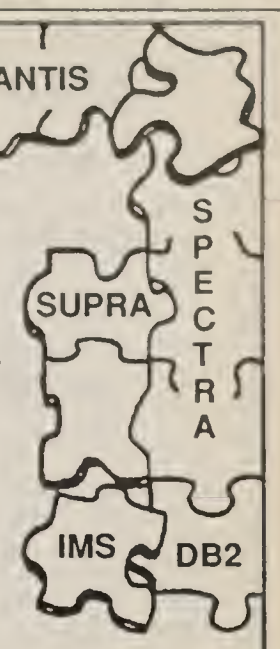

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University of Virginia

Chief Information Officer

The University of Virginia is seeking a talented individual to become it's Chief Information Officer.

The responsibilities of this newly created position will be: to coordinate (and integrate where possible) all the diverse aspects of the University community towards a single direction for information technology; to bring together all University services required to meet the needs of the faculty, students and administration in the areas of computing, information processing, instructional media, and telecommunications--focusing on the mission(s) of the University.

Candidates should have a Masters degree with a Ph.D preferred. A record of accomplishment in the field of information technology demonstrating the ability to provide the "vision" to lead the University in the use of information technology. Extensive knowledge of computer(s), information technology, heterogeneous computing environment(s), diverse computing environments are a prerequisite. Extensive managerial experience in working with management at all levels in formulate, develop, and implement strategic plans for information technology through the 1990's and beyond.

Interested Candidates Should Apply To: Michael Luskin Associates. The Lodge Building, 1407 Bethlehem Pike, Flourtown, PA 19031. (215)836-9050. The position will remain open until filled.

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The position requires a minimum of ten years experience in software development with at least five years of successful information management in a large IBM MVS environment. Demonstrated abilities to implement complex systems, interface with senior management and customers and the desire to grow the business are requirements. Previous experience in the financial industry along with a programming background is a plus.

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Project Manager to manage, design, program and implement proprietary Wang VS software and document management systems for use in client business environment; writing and maintaining software programs in both large mainframe-based systems and microprocessor-based systems; consulting with clients regarding their software program and/or data processing needs; conducting analyses of technological problems to correct client system use; programming in languages such as PACE, COBOL, Dbase and BASIC to troubleshoot and audit systems in development. Applicants must possess Bachelor's degree in Mathematics plus two years' experience in job offered or two years as Systems Consultant. Experience must have included systems design and analyses in a Wang VS and VS networking environment using Wang VS to PC communications & dBase & PACE & COBOL & BASIC software/languages. Experience also must have included one year of supervision of subordinate systems analysis and programming personnel. 40 hrs., 9 a.m. to 5 p.m., $34,000 per annum. Must have proof of legal authority to work permanently in the U.S. Send resume to Illinois Department of Employment Security, 401 South State Street, Three South, Chicago, Illinois 60605, Attn: Ms. C. Donoghue, Ref. No. V-IL-3478-U. NO CALLS. AN EMPLOYER PAID AD

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Plans, schedules, manages and directs preparation of computer programs to process business and solve business-oriented problems of a wide variety of business clients by use of electronic data processing equipment including IBM 3090, 4361, 4381, 370 and ICL 2904 utilizing computer software of MVS, MVS/XA, MVS/ESA, DOS/VSE, VM, IDCAMS, FILE-AID, LIBRARIAN, DFHSM, CLIST, INTERTEST, DBUG AID, CICS, IMS DB/DC, DB2, GPSS, TSO, ISPF/PDF, COBOL, PL/I, FORTRAN, PASCAL, 370 ALC; manages the study and evaluation of existing client applications systems using relational data bases and on-line teleprocessing software, supervises the analysis, modification, redesign and reengineering of inputs, functions and outputs, arranges for planning and execution of necessary modifications, install, test and implement application packages. Educate and train the client in the use and maintenance of the application software and packages. Convert data and programs from one hardware/software platform (like IBM 4361, 4381, ICL 2904, DOS/VSE, VM) to another platform (like IBM 3090, MVS/XA, MVS/ESA). Reorganize and tune the relational and biararcical data bases. Write utility programs/ CLIST's for use by programmers and operators. Develop programs for fixing data in the databases and online VSAM files. REQUIREMENTS: Must possess a Bachelors degree in Computer Science or Engineering. Must possess at least 2 years experience in the job offered or 2 years experience as Computer programmer. Required experience must include at least two years' advanced experience in designing and developing commercial applications by using the following computer hardware & software: IBM 3090, IBM 4361, IBM 4381, IBM 370, ICL 2904, MVS, MVS/XA, DOS/VSE, VM, IDCAMS, FILE-AID, CLIST, CICS, IMS, DB/DC, DB2, GPSS, TSO, ISPF/PDF, COBOL, PL/I, FORTRAN and PASCAL. 40 hour work week. Hours: 8:00 a.m. to 5:00 p.m. Salary: $40,000 per year. Must have proof of legal authority to work permanently in the U.S. Interested applicants send 2 copies of your resume to: Illinois Department of Employment Security, 401 South State Street, 3 South, Chicago, Illinois 60605. Attention: Ms. Lyke. Reference #V-IL-4201-L. NO CALLS. An employer paid ad.

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Senior Computer Analyst/Programmer to design, develop, implement, maintain & support management information systems: liaise with clients to identify business needs & application requirements including evaluate, install & modify purchased hardware & software products; develop application specifications to obtain specificity & to diagnose/resolve problems with existing systems; design systems in accordance with application requirements, corporate standards, & to ensure execution of efficiency, flexibility & maintenance; prepare estimates of resources & schedule required to complete application; schedule & monitor progress & determine additional initiative required; program complex solutions using CICS, DB2, COBOL, CSP software for MVS, VM, PC hardware; prepare coded interfaces between application programs & equipment using JOL, JCL, EXECS; utilize database management systems including DB2/SQL for retrieval, updating & design; prepare client manuals & system libraries' documentation; conduct system review with managers, clients & team members; assist in user training; conduct feasibility studies to develop new systems including budgeting, client interviewing, use of Superproject software on a mainframe system. Master of Science in Information Systems required as well as 1 year experience in job offered or 1 year experience as Computer Analyst/Programmer. Must have completed 1 course each in: computer system modeling; database design; database technologies; information systems analysis & design. Academic program or industrial experience must have included conducting a feasibility study on developing new systems including budgeting, client interviewing, & use of Superproject software on a mainframe system. Will accept applicants with functional title of Computer Science Tutor. Must have proof of legal authority to work permanently in the U.S. 40 hours 9:00am to 5:00pm, $36,040/year. Send resume to Illinois Department of Employment Security, 401 S. State-3 South, Chicago, Illinois 60605, Attn: R. Weston, Ref. #V-IL-3933-W. No Calls. Employer paid ad.

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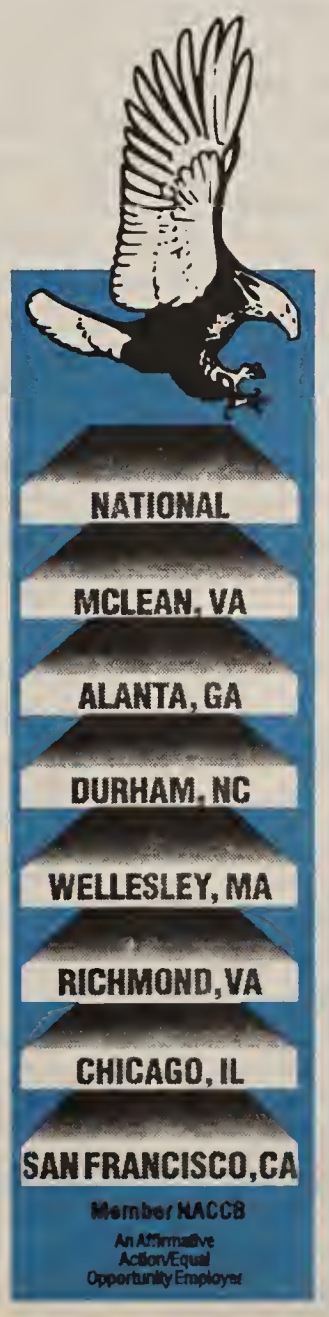

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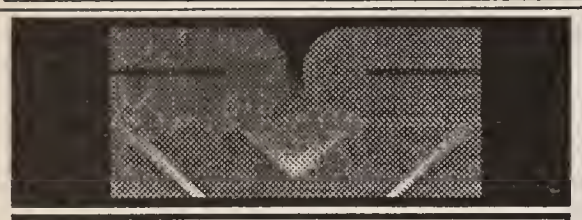

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Digital Systems Specialist/Computer Analyst to research, evaluate & recommend new computing technology; direct training of all engineering & plant personnel at Texas City facility in use of firm proprietary computer software systems utilizing principles of chemical engineering, process control, unit operations & operation management; develop & maintain specific firm patented process programs; ensure smooth interfacing of all engineering & production workstations running on coax & ethernet as well as between programmers & users; provide support for terminal emulation software for IBM, SNA, TCP/IP, DEC LAT & IPX; oversee PC & firm mainframe user support. Bachelor's degree in Petroleum Engineering Technology required as well as 1 year experience in job offered or 1 year experience as Senior Production Technologist and/or Production Technologist. In lieu of Bachelor's degree in Petroleum Engineering Technology, will accept applicants with Associate's degree in Natural Gas & Petroleum Technology & 3 years experience as Production Technologist and/or Senior Production Technologist. All experience must have been gained in petroleum industry including development & maintenance of engineering simulation & analysis programs on an IBM 370 mainframe ensuring correct interfacing between engineering & field workstations, users & programmers. Experience must have also involved development of cost accounting & daily production accounting systems & providing support for a field remote data entry system & maintenance management systems. Applicant must have completed 1 course each in: unit operations; numerical methods for gas oil; oil refining; computer applications; statistics & numerical methods; process dynamics. 40 hours 8:00am to 4:30pm, $34,770/year. Apply at the Texas Employment Commission, Texas City, Texas or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778, J.O. #6599140. Ad Paid by an Equal Employment Opportunity Empolyer.

Systems Specialist, 37.5 hrs/wk., 9:00am - 4:30pm, $32,750/year. Design, development, optimization and testing of new software applications to increase the efficiency of computerized mortgage loan origination and servicing systems. Tools: IMB/HOGAN; COBOL; Easytrieve; TurboPascal; PS2. Master of Science in Computer Science as well as six months experience as a Systems Specialist or Research Assistant required. Previous experience must include work with TurboPascal and mainframe computers. Graduate education must include one course each in: Database Systems Design; Operating Systems. Must have proof of legal authority to work permanently in the U.S. Send resumes to: ILLINOIS DEPARTMENT OF EMPLOYMENT SECURITY, 401 South State Street - 3 South, Chicago, Illinois 60605, Attention: Gordon Doliber, Reference #V-IL-4127-G, NO CALLS, AN EMPLOYER PAID AD.

Technical Support Specialist with responsibility for computer operating system software design and problem resolution; provide technical support, assist in troubleshooting and implementation of ACF2 software within IBM mainframe environment; assure proper interface with CICS, IDMS, SAF, MVS, OS and software for teleprocessing; use IBM Assembler language Job Control language, operating system and related software such as DB2, IMS, and DataComm; review, analyze, define and report technical problems; clarify customer interpretation on technical manuals and documentation; make recommendations to customers providing assistance in defining and implementing security policy; explain execution flow and functionality with other secure products; assure compliance with special requirements at user installations; assure proper telecommunications and database systems interface. Applicants must possess Bachelor of Science degree in Computer Science plus six months in job offered or six months as Systems Analyst/Programmer. Coursework must have included: IBM Assembler Language, Job Control Language, operating systems, data structure, data base systems including DB2, IDMS and Datacomm, teleprocessing applications and advanced programming. Academic program must have been conducted in IBM mainframe environment. Experience gained with title of Staff Assistant acceptable. 40 hrs., 8 a.m. to 4 p.m., $31,200 per annum. Must have proof of legal authority to work permanently in the U.S. Send resume to Illinois Department of Employment Security, 401 South State Street, Three South, Chicago, Illinois 60605, Attn: Mary Millea, Ref. #V-IL-3990-M. NO CALLS. AN EMPLOYER PAID AD.

Software Engineer to develop positioning & locating software for Intelligent Vehicle Highway Systems (IVMS) including: design & implement software for dead reckoning sensor processing, map matching & Global Positioning System (GPS) signal processing; integrate inputs via modern filtering techniques including kinematic position filters & LMS, to derive absolute vehicle position & heading; assist in overall software architecture design & development of navigational system involving vehicle positioning;, route planning & route guidance, driver interface, driver display devices including displays & keypads, radio frequency (RF) equipment for satellite positioning & communications with traffic control center, to ensure all subsystems & interfaces are compatible & extensible for future feature enhancements; liaise with Canadian subcontractor in design of components of navigation system. Bachelor's degree in Surveying Engineering as well as 2 years & 6 months experience in job offered or 2 years & 6 months experience as Surveying Engineer. Will accept applicants with title of Research Assistant but whose functional duties were as Surveying Engineer. Must have conducted academic or industrial research on design & development of AVLN utilizing kinematic position filters, dead reckoning, map matching & GPS satellite positioning operating in real time using C programming language. Must have completed 1 course in each: least squares estimate & analysis; Navstar GPS theory & applications; automatic vehicle location & navigation; digital terrain modeling; photogrammetric mapping; position based land information systems. Must have proof of legal authority to work permanently in the U.S. 40 hours 8:00am to 4:30pm, $41,200/year. Send resume to Illinois Department of Employment Security, 401 S. State-3 South, Chicago, Illinois 60605, Attn: Gordon Doliber, Ref. #V-IL-4533-G. No Calls. 2 copies of your resume required. Employer paid ad.

Systems Analyst: Evaluates, maintains, monitors (PICK/REALITY) software programs for company-wide McDonald Douglas computers systems to input & retrieval of data of operations for intern'l electronics comp. Makes necessary program tests & correction of errors of computer equipment & interfacing with other systs, e.g., P.C's, Spooler printing syst., JET w/p Interprocess Communication & voice mail syst. Restores missing data due to syst. problems. Monitors operations of data syst. & software. Resolves question of program intent, input data acquisitions; suggests refinements of data for conversion into programmable form; specifies logical operations for equipment units; applies testing procedures to layout, build, troubleshoot, repair & modify computer syst. Serves as info. source to users for computer syst. Total hrs/wk: 40, 9a.m.-5 p.m. Sal. $41,000/yr. Min. ed: H.S. 4 yrs, Wk exp: 1 yr, Systems Analyst or 4 yrs Programmer exp. Must have 4 yr. exp. working on McDonald Douglas mainframes, PICK/REALITY software, interprocess communications & Spooler printing systems, Voice mail systems, & modems. **Must have proof of legal authority to work permanently in U.S.** Send resumes to: Ill. Dept of Empl. Security, 3 S. 401 So. State St. Chicago, IL 60605, Attn: Bessie King, Ref. # V IL-4298-A. NO CALLS. AN EMPLOYER PAID AD.

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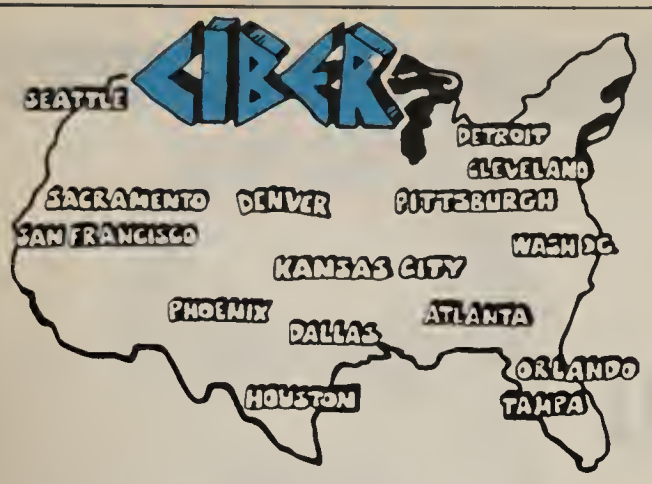

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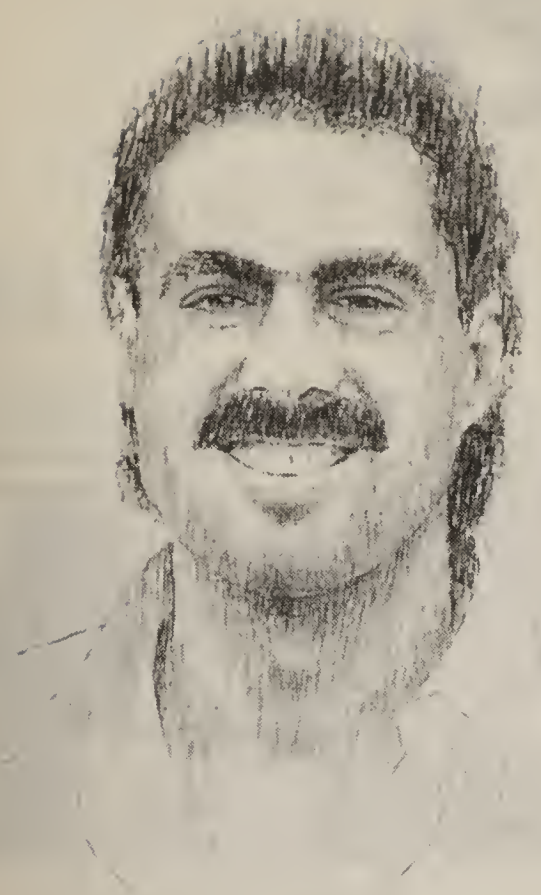

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The right ways to cut costs

BY JOEL B. GILMAN
SPECIAL TO CW

If you are like many information systems professionals, you are probably lawyer-aversive. Chances are, you prefer to steer clear of all members of that overpaid profession, unless a deal goes sour and you need a briefslinger to fight things out for you in court. That's a good way to save yourself into the poorhouse.

Preventive legal advice may cost more than you like, but it's a bargain compared to what you would have to pay for litigation. At a minimum, expect to spend $30,000 on legal fees alone in a lawsuit, regardless of who you are suing, or why, or for how much.

Preventing problems

Some examples of potentially thorny issues and questions that a lawyer could help you to resolve are the following:

- If a system doesn't work, who should pay for the downtime and lost productivity?
- Does the IS organization have the right to retain a consultant to rewrite source code written by a previous consultant?
- If the vendor can't make a system work properly, should it pay for the cost of hiring another consultant to finish the job?
- What recourse do you have if the vendor doesn't deliver a system on time?
- What action can be taken if the IS organization misses a payment?

Larger organizations generally have in-house counsel, but IS managers are reluctant to "run it by legal" for fear of being seen as inept, or worse yet, on the mistaken belief that the attorney simply has better things to do.

Nothing could be further from the truth. Corporate legal departments are beginning to take the view that they exist to serve the entire organization, not just selected niches. As a result, you will probably find your legal department more than happy to address your inquiries and work with you on acquisition problems.

Not all in-house attorneys have the expertise to handle IS issues, however. The traditional corporate lawyer has extensive training and experience in corporate law: shareholder rights, powers and duties of the board of directors, mergers and acquisitions, securities matters, taxes and labor laws.

If your corporate legal staff does not include computer law expertise, you may have to seek outside counsel. The problems that can be posed by a contract for acquisition, development or ongoing maintenance of a complex system go far beyond basic contract law, so the help of a specialist is a virtual necessity.

If you do have to go outside, ask around your community for referrals. Make a list of possible attorneys and interview each of them to see whether they really understand your business and whether you feel comfortable talking with them.

Compare large law firms with small firms and sole practitioners; bigger firms aren't necessarily better, but they do tend to charge more because of their increased overhead.

Regardless of where you seek help, there are things you can do to keep a lid on legal costs.

First of all, bear in mind that anything you can do to save the attorney time will save you money. For example, whenever you have a meeting with your attorney, make a list of specific issues or questions you want to have addressed. This way, all of your concerns can be covered more quickly, but with full attention given to them.

Cost control

Another way to keep costs under control is to simply accept the fact that the attorney does not know your situation as well as you do and will need to ask you a lot of questions. The questions may seem obvious, irrelevant or pointless, but let the attorney direct the conversation and answer each question asked — no more and no less.

The most efficient way for someone to gather information is to ask questions from a knowledgeable source. By attempting to short-circuit this process with a comprehensive lecture, you may be making the lawyer's task more difficult.

The reason this is so is because attorneys learn by a process of collecting and filtering information. For example, if you don't understand the answer to the first question, you should ask additional questions to clarify the specific points you don't understand.

Many clients will attempt to "clarify" things that don't need to be clarified, responding with an encyclopedic answer that is impossible to assimilate and may or may not address the specific question asked. While this may seem like a more helpful response, you are probably just making the process longer and running up your costs.

AT A MINIMUM, expect to spend $30,000 on legal fees alone in a lawsuit, regardless of who you are suing, or why, or for how much.

Gilman is an attorney and mediator, practicing computer law in Seattle.

Buy/Sell/Lease

The BoCoEx index on used computers

Closing prices report for the week ending December 20, 1991

	Closing price	Ask	Bid
IBM XT Model 089	$375	$450	$375
AT Model 099	$500	$525	$475
AT Model 239	$550	$650	$500
AT Model 339	$750	$1,000	$700
PS/2 Model 30 286	$750	$900	$700
PS/2 Model 60	$900	$1,500	$900
PS/2 Model 80	$2,250	$2,600	$2,150
PS/2 Model 90	$4,300	$4,600	$4,100
Compaq Portable II	$500	$650	$475
Portable 286	$900	$1,000	$800
Portable 386	$1,800	$1,900	$1,500
SLT 286	$1,200	$1,300	$1,000
LTE 286	$1,000	$1,300	$900
Deskpro 286	$825	$1,000	$775
Deskpro 386/20	$2,000	$2,300	$1,900
Apple Macintosh Plus	$700	$750	$650
SE	$1,010	$1,050	$950
IIX	$3,100	$3,350	$3,000
IICI	$3,700	$3,800	$3,700
IIFX	$4,600	$4,900	$4,400

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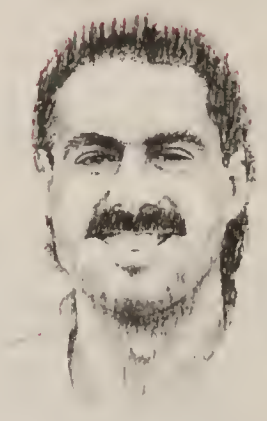

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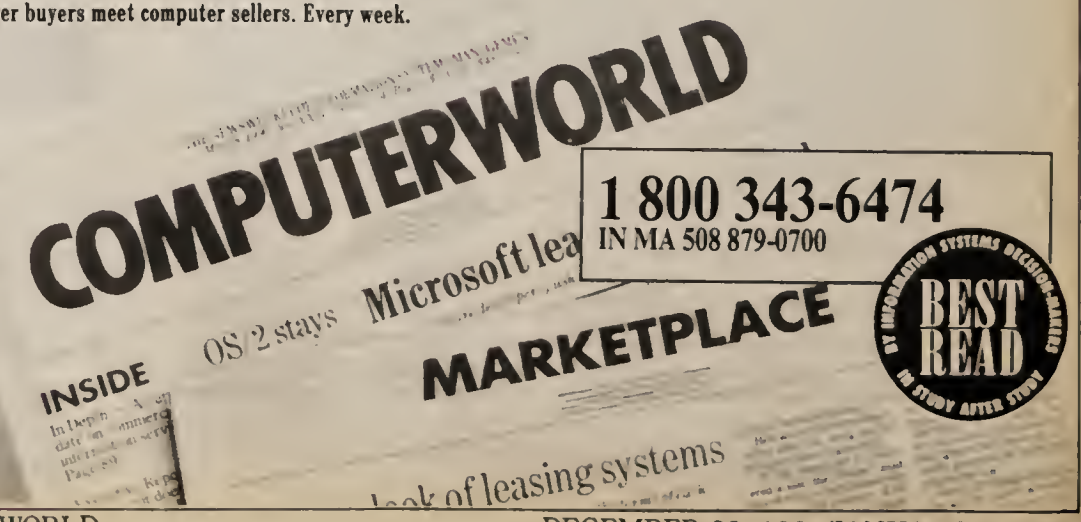

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RFP No. 2132, due Fri, 1/17/92 at 3:30 p.m. for twelve (12) 80386SX microcomputers, three (3) printers, and peripherals for the MISSISSIPPI GULF COAST COMMUNITY COLLEGE.

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Involvement in the Purchase of Computer Systems by Computerworld Subscribers in User Organizations*

Personal Computers	69%
MiniComputers	61%
SuperMiniComputers	58%
Mainframes	42%

* Source: STAT Resources Profile of Computerworld Subscribers, November 1987

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News flash: Xmas spirit missing; Grinch on lam

BY COMPUTERWORLD STAFF

As the new year dawns, away in the data center sits a threadbare Christmas tree by a darkened menorah. After a season in which the Grinch may have succeeded in heisting the holiday spirit, there was not much in the way of high-tech booty waiting for many information systems professionals and their staffs.

The recession has spurred more belt-tightening, while the aftermath of megamergers has left some IS and microcomputer managers fearful for their jobs. A number of executives from a cross-section of U.S. industries sketched out their wish lists for the coming year. The message: Patience is wearing thin.

Bruce Kane, IS director at Union Gas Ltd., says he'll be satisfied only by "truly open systems" and suggested, "How about a little more honesty about products in general?"

Rick Christjansen, manager of administrative and technical support at Manville Corp. in Denver, suggested, "Apple should deliver products when they announce them or don't announce them."

In a nutshell, users want "open" open systems, products tailored to real needs, technology that will help them do more with less and better communications across the board.

Here is a sampling of users' aspirations for 1992:

Quality is job No. 1

Tom Loane, vice president of IS at Alamo Rent A Car, Inc.:

"To everyone that sells software, please get it right before you ship it. This has not been a year where I was impressed with quality."

Loane: *Get it right*

.....

Evan Wride, director of the IS Division at Nissan Motor Corp.:

"We've got to reduce the time it takes to complete systems development, from the current two to four years down to six to 12 months. If we don't, we won't be able to keep up."

.....

(Really) open systems

Mick Connors, senior vice president of Management Information Services at The Gap Stores, Inc.:

"Getting to open systems quicker is our No. 1 priority . . . but there's not a common user interface. That poses big problems for our developers."

Beckman: *Network harmony*

.....

Tom Fermazin, staff planning coordinator at Amoco Corp.:

"We're hoping for open systems — that is, greater participation by vendors in a mix-and-match, open world."

.....

Standardization

Roger Jamboor, vice president of The Dun and Bradstreet Corp.:

"A truly robust environment for building truly transportable applications. From DOS to Windows to OS/2 to Unix. One that really works. No bull."

.....

Charles Darnell, chief information officer at Lithonia Lighting:

"I'd like for Microsoft, IBM and the rest to quit arguing and settle down on operating systems that make sense. Posturing about who has the biggest stick is not doing customers any good."

Darnell: *Quit arguing*

.....

Arthur Beckman, manager of information technology services at Pacific Gas & Electric Co.:

"Peace on earth among networking standards — particularly in naming services, electronic mail and E-mail-enabled applications."

Horwich: *Support, support!*

Talk to me

Joseph J. Leo, deputy administrator for management at the Food and Nutrition Service of the U.S. Department of Agriculture:

"Vendors are not as forthcoming as users need them to be for strategic planning. I don't know where the industry is settling down. I don't have the warm and fuzzies."

.....

Jon Tankersley, research scientist, senior grade, Amoco Production Research:

"It would be be nice if computer and third-party vendors would get together and figure out the right way to implement things. A lot of times, they go off and do things half-baked."

.....

Less has to be more

Julian Horwich, executive director at the Corporate Association for Microcomputer Professionals:

"The biggest wish is for things that would make support tasks easier and would help users get more done in less time. It's the same old story. Getting enough support people in these times of budgetary crunch is even more difficult."

NEWS SHORTS

Modeled on Intel

Unisys Corp. has announced plans to standardize its microprocessor-based products around Intel Corp.'s X86 microprocessor chip family. The two companies also said they would work together to develop advanced Unix software and multiprocessor hardware, with an eye toward developing "high-end, on-line transaction processing implementations." Separately, Unisys and Sequent Computer Systems, Inc. extended an OEM agreement through January 1994, first signed in January 1989.

MCI names CEO

MCI Communications Corp. founder William G. McGowan has passed the mantle of chief executive officer to longtime senior executive Bert C. Roberts Jr., MCI's president and chief operating officer since 1985. McGowan, 64, who founded MCI in 1968, will continue as chairman of the board.

Hitachi, IBM deal

IBM has confirmed reports that Hitachi Ltd. will resell IBM notebook computers in Japan beginning this spring. The boxes, which will be made and sold exclusively in Japan, will run a Japanese version of the MS-DOS operating system. Hitachi has reportedly signed on to buy a minimum of 2,000 little Big Blues a month — an agreement that could be worth some $30 million to IBM. Word of the deal came as IBM announced new initiatives to target OEM distribution.

Changing face

Chase Manhattan Bank Senior Vice President Craig D. Goldman has been appointed chief information officer. He is now responsible for all computer systems throughout the company. Separately, San Francisco-based McKesson Corp. appointed David E. McDowell president and chief operating officer, as well as director. McDowell, a 30-year IBM veteran, was vice president and general manager of quality and CIO for IBM U.S.

Second home

The Open Software Foundation has named a new chairman, M. "Mike" Saranga, IBM's assistant general manager of systems, structure and management. Saranga, who will keep his job at IBM, replaces interim chairman Peter Schneider, assistant general manager for manufacturing and developing at Hewlett-Packard Co.

Intel gets break

U.S. District Judge James Ware granted Intel a partial summary judgment in Advanced Micro Devices, Inc.'s antitrust suit. The judge granted Intel's motion on the grounds that the four-year statute of limitations had passed prior to AMD's filing of the complaint. AMD said the ruling was a 'legal technicality.

DEC to post first loss from operations

MAYNARD, Mass. — Unrelenting economic and competitive pressures, combined with declining demand for large systems, will cause Digital Equipment Corp. to post its first-ever quarterly operating loss.

DEC customers have held back purchases of big-ticket systems, opting to wait for recently unveiled — and aggressively priced — workstations, servers and large-scale systems, analysts said. The company, however, has gained customer confidence through its new products and by restructuring software licensing, analysts said.

Given DEC's fiscal conservatism, staff reductions beyond the 10,000 that the company announced earlier this year will probably not delay product rollouts or development, said Neal Hill, a senior analyst at Forrester Research, Inc.

Results for DEC's second quarter, which ended Dec. 28, are set to be released Jan. 16.

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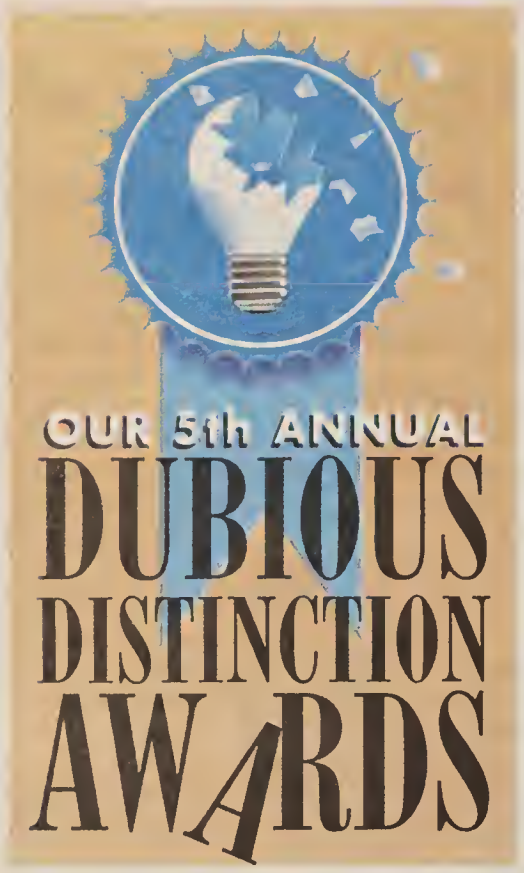


The best of the worst from 1991. Compiled by Joseph Maglitta. Illustrations by Tom Monahan.

"Being serious is not a liability when you are talking about computers."
– Buzz Luttrell

Be thankful they didn't call it "Stampede of Titles."
To promote its "Title Wave Alert" for new products at Comdex, Generic Software mailed journalists small plastic bags filled with dyed blue water, small weeds and sand.

"Mommy, why am I named DEL DIR?"
Babynamer, a computer program that helps parents name newborns, was introduced by Study Ware.

"Darn, did we say 1991?"
OS/2 2.0 and Windows 3.1 were both supposed to ship in 1991. With luck, a stripped-down OS/2 might make it for last call on New Year's Eve. Don't expect the latest version of Windows until March.

Best since Sperry's in 1985
NCR received seven awards for its 1990 annual report.

Remember when TM was something that was supposed to calm you down?
CSC/Index Group trademarked the term "re-engineering," thereby guaranteeing thousands of little ™s will appear in all its literature and forcing competitors to think up dozens of tongue-twisting euphemisms for an already euphemistic term.

Two more reasons to worry about Japan:

We hear the matching panties play "Close to You."
To celebrate the bicentennial of Mozart's death, a Japanese lingerie maker designed a brassiere with a tiny memory chip that plays 20 seconds of the Austrian composer's music.

Goodbye, Mr. Chips?
Robots dance at Japanese festival of the dead.
Headline of item from IDG News Service, Asian bureau

Can I show you something nice in a PC package, my friend?
Automatic Data Processing, Inc. (ADP) in Roseland, N.J., provided car dealers with software that reportedly generated numbers misleading to auto consumers. Salesmen allegedly used the financial printouts to bamboozle customers into buying a car with a loan instead of with cash. The Federal Trade Commission ordered a halt to the practice.

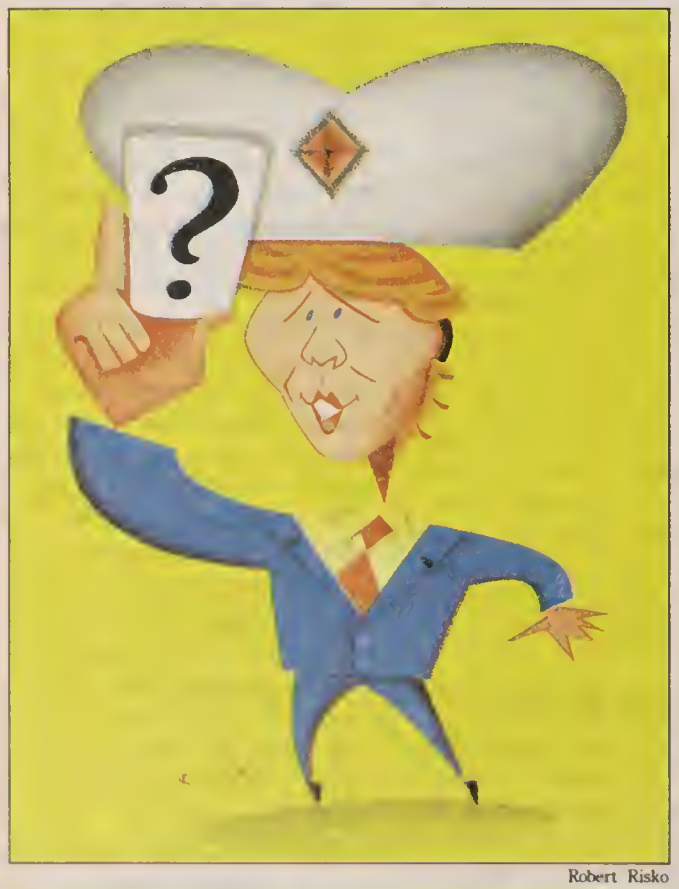
PUH-LEEZ! No sympathy for this devil

"(Our speaker) has been described as having the stage presence of Mick Jagger, facilitation skills of Phil Donahue and the inspirational message of Norman Vincent Peale." —
Press release publicizing a monthly meeting of the Society for Management of Professional Computing, Inc.

"No, you idiot! How many times do I have to tell you, it's spelled B-I-N-A-R-Y. . ."
First Byte in Santa Ana, Calif., introduced a $149 talking PC software utility called Monologue that vocalizes errors in spelling, grammar and spreadsheets.

Inevitable
"Middleware" • "Newtech"
"Marketecture" • "Coopetition"

Paul predicts...



Robert Risko

. . . a look at the coming year by Executive Editor Paul Gillin

January: Borland announces it has made a breakthrough in object-oriented software development that will enable it to improve programmer productivity dramatically. From now on, the company says, all Borland product development will be done in Minneapolis by a guy named Phil.

February: AT&T sells off its NCR computer division, claiming its $7.4 billion buyout was "a big joke," and the telecom giant was "never that big on computers anyway." NCR is snapped up by a well-known New York real-estate baron who renames it Trump Computer.

March: IBM finally ships OS/2 2.0, claiming that every feature that customers have requested has been incorporated into the code. Reviewers agree the product is complete but express concern that an Enterprise System/9000 mainframe is required to run it.

A chagrined Bill Gates admits that OS/2 "really does do better Windows than Windows" and acknowledges that "we were really wrong about OS/2. It's a great product."

Hell freezes over.

April: Boeing stuns the industry when its IS department unilaterally outsources the rest of the company.

Researchers announce they have isolated the shortest event in the universe — the career expectancy of a CIO at a Fortune 500 company.

May: Bull and Siemens announce plans to merge but call it off because the combined company's new name is judged as too embarrassing.

June: *Computerworld* celebrates its 25th anniversary with a special issue profiling the only 25 people in the world who care anymore about the Cobol standards debate.

In a dramatic move to improve on its image as arrogant and remote, IBM changes its name to "Big Blue Buddy."

July: Apple and IBM announce that nearly a year after their historic alliance, they have finally agreed on a design for their letterhead stationery.

A security infraction at a major bank goes undetected until ATM customers start getting little slips with their weight and horoscope instead of cash.

August: Lotus says it has finally fixed all the bugs in 1-2-3 for Windows but chafes at criticism that it has released too many bug fixes. Free upgrades are being mailed for Release 3.14159²B/42V5.

September: Apple wins its copyright infringement suit against Microsoft over the look and feel of Windows. As punishment, the judge forces every Microsoft employee to spend a month on the road with nothing to work on but a Macintosh Portable.

October: Compaq reports its first profitable quarter in nearly a year, attributing the rebound to a renewed focus on its roots. From now on, the company says, all future products will be designed on a place mat in a Houston diner.

November: Big Blue Buddy (formerly IBM) introduces OS/2 Pen, its operating system for the pen computing market. The product runs on a sleek, black, 12-ounce handheld computer hitched to a disk drive that the user must carry around in the trunk of a Buick.

December: The end of 1992 arrives with all the vendors that had promised to deliver products by now vowing that they really, ***really*** will deliver by mid-1993.

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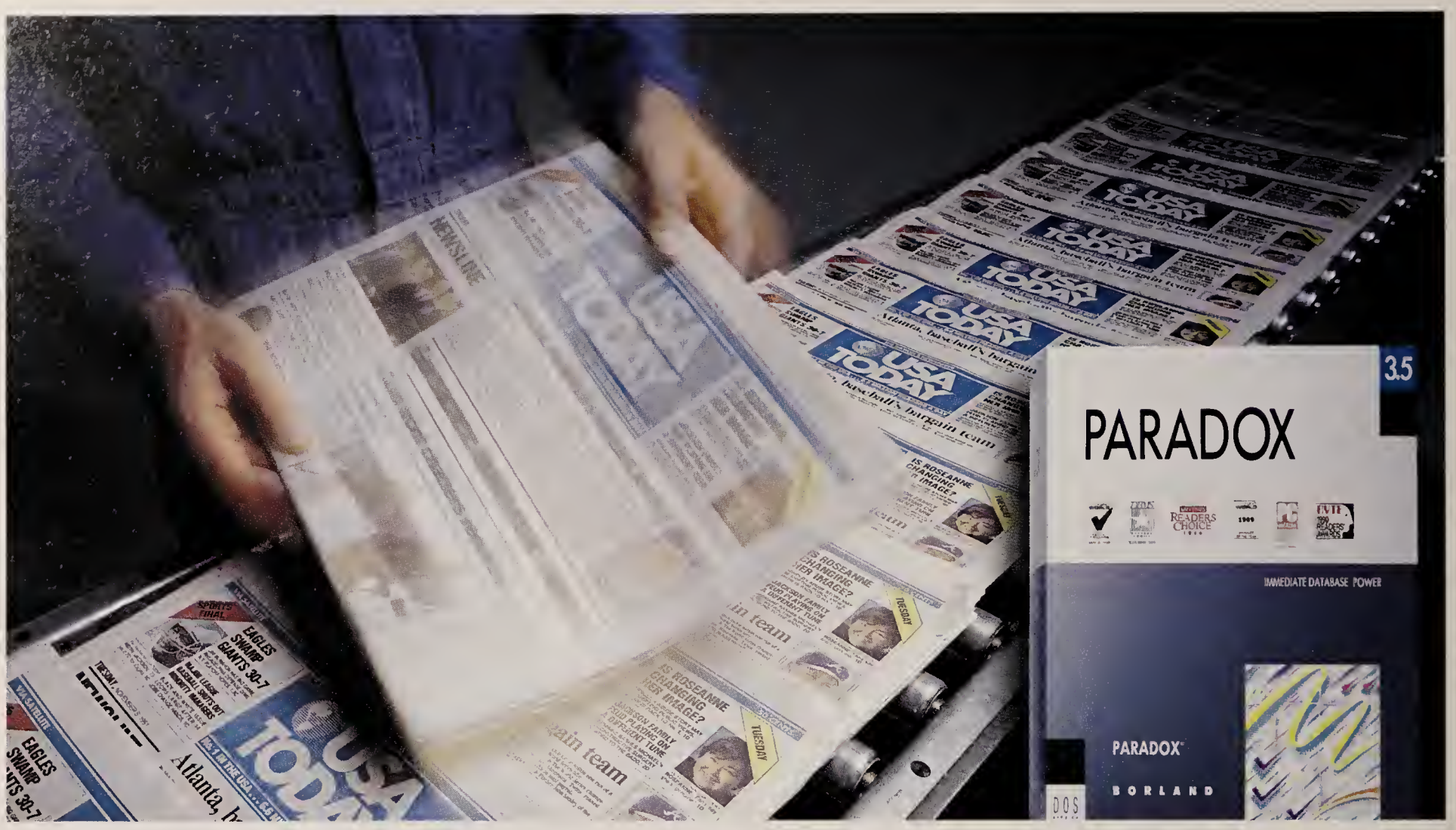

How Borland's Paradox Is Making News in the USA . . . TODAY

USA TODAY® has changed the way Americans look at newspapers. As "The Nation's Newspaper,™" *USA TODAY* goes after critical, in-depth stories that affect people across the country.

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The Dawn of "Database Journalism"

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The S&L Scoop

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—*Computerworld*
April 8, 1991

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—*InfoWorld*
November 12, 1990

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